Thecus

N0503
N4200 series
N5500
1U4600
N7700 series
N8800 series

User's Manual

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About This Manual

All information in this manual has been carefully verified to ensure its correctness. In case of an error, please provide us with your feedback. Thecus Technology Corporation reserves the right to modify the contents of this manual without notice.

Product name: Thecus N0503/N4200 series/N5500/1U4600/N7700 series/N8800 series
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Limited Warranty

Thecus Technology Corporation guarantees all components of Thecus NAS products are thoroughly tested before they leave the factory and should function normally under general usage. In case of any system malfunctions, Thecus Technology Corporation and its local representatives and dealers are responsible for repair without cost to the customer if the product fails within the warranty period and under normal usage. Thecus Technology Corporation is not responsible for any damage or loss of data deemed to be caused by its products. It is highly recommended that users conduct necessary back-up practices.

Safety Warnings

For your safety, please read and follow the following safety warnings:

- Read this manual thoroughly before attempting to set up your Thecus IP storage.
- Your Thecus IP storage is a complicated electronic device. DO NOT attempt to repair it under any circumstances. In the case of malfunction, turn off the power immediately and have it repaired at a qualified service center. Contact your vendor for details.
- DO NOT allow anything to rest on the power cord and DO NOT place the power cord in an area where it can be stepped on. Carefully place connecting cables to avoid stepping or tripping on them.
- Your Thecus IP storage can operate normally under temperatures between 5°C and 40°C, with relative humidity of 20% – 85%. Using Thecus IP storage under extreme environmental conditions could damage the unit.
- Ensure that the Thecus IP storage is provided with the correct supply voltage (AC 100V ~ 240V, 50/60 Hz, 3A). Plugging the Thecus IP storage to an incorrect power source could damage the unit.
- Do NOT expose Thecus IP storage to dampness, dust, or corrosive liquids.
- Do NOT place Thecus IP storage on any uneven surfaces.
- DO NOT place Thecus IP storage in direct sunlight or expose it to other heat sources.
- DO NOT use chemicals or aerosols to clean Thecus IP storage. Unplug the power cord and all connected cables before cleaning.
- DO NOT place any objects on the Thecus IP storage or obstruct its ventilation slots to avoid overheating the unit.
- Keep packaging out of the reach of children.
- If disposing of the device, please follow your local regulations for the safe disposal of electronic products to protect the environment.

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Chapter 1: Introduction

Overview

Thank you for choosing the Thecus IP Storage Server. The Thecus IP storage is an easy-to-use storage server that allows a dedicated approach to storing and distributing data on a network. Data reliability is ensured with RAID features that provide data security and recovery—over multiple Terabyte of storage are available using RAID 5 and RAID 6. Gigabit Ethernet ports enhance network efficiency, allowing Thecus IP storage to take over file management functions, increase application and data sharing and provide faster data response. The Thecus IP storage offers data mobility with a disk roaming feature that lets you swap working hard drives for use in other Thecus IP storage, securing the continuity of data in the event of hardware failure. The Thecus IP storage allows data consolidation and sharing between Windows (SMB/CIFS), UNIX/Linux, and Apple OS X environments. The Thecus IP storage's user-friendly GUI supports multiple Languages.

Product Highlights

File Server

First and foremost, the Thecus IP storage allows you to store and share files over an IP network. With a Network Attached Storage (NAS) device, you can centralize your files and share them easily over your network. With the easy-to-use web-based interface, users on your network can access these files in a snap.

To learn about the Web User Interface, go to
Chapter 5: Using the Thecus IP Storage > Using WebDisk.

FTP Server

With the built-in FTP Server, friends, clients, and customers can upload and download files to your Thecus IP storage over the Internet with their favorite FTP programs. You can create user accounts so that only authorized users have access.

To set up the FTP Server, refer to
Chapter 4: System Network> FTP .

iTunes Server

With the built-in iTunes server capability, the Thecus IP storage enables digital music to be shared and played anywhere on the network!

To set up the iTunes Server, refer to
Chapter 4: Application Server>iTunes Configuration.

Backup Server

Don't leave precious data to chance. With advanced backup capabilities, you can easily upload mission critical files to the Thecus IP storage, and even automate your backup tasks for true peace-of-mind.

To find out how to backup your files with the Thecus IP storage, refer to
Chapter 4: Backup >Nsync.

Printer Server

With the Thecus IP storage's Printer Server, you can easily share an IPP printer with other PCs connected to your network.

To set up the Printer Server, refer to
Chapter 4: Application Server>Printer Information.

Multiple RAID

Thecus IP storage supports multiple RAID volumes on one system. So, you can create RAID 0 for your non-critical data, and create RAID 1,5 or 6 (depend on model) for mission-critical data. Create the RAID levels depending on your needs.

To configure RAID modes on the Thecus IP storage, refer to
Chapter 4: Storage Management >RAID Information.

iSCSI Capability

Thecus IP storage is not only a file server, but it also supports iSCSI initiators. Your server can access Thecus IP storage as a direct-attached-storage over the LAN or Internet. There is no easier way to expand the capacity of your current application servers. All the storage needs can be centrally managed and deployed. This brings ultimate flexibility to users.

To set up an iSCSI volume, refer to
Chapter 4: Storage Management > Space Allocation > Allocating Space for iSCSI Volume.

Superior Power Management

Thecus IP storage supports schedule power on/off. With this feature, administrator can set at what time to turn on or off the system. This feature is a big plus for people who want to conserve energy. Wake-On-LAN enables administrator to remotely turn on the system without even leaving their own seat.

To schedule system on and off, refer to
Chapter 4: System Management> Scheduled Power On/Off

Package Contents

The Thecus IP storage should contain the following common items:

- System Unit x1
- QIG (Quick Installation Guide) x1
- CD-Title x2 (Acronics backup CD (except N0503), Twonky media server CD & Universal CD)
- Ethernet Cable x1
- Accessory bag x1
- HDD Compatibility list Card x1
- Multiple Languages Warranty Card x1
- Power cord x1

Your N0503 package should contain additional items:

- 3 to 5 HDD cage x1 (Installed)
- 3.5” HDD rail x6
- Power Adaptor + Power cord x1

Your N4200 series package should contain additional items:

- Power adapter + Power cordx1

Your N5500 package should contain additional items:

- USB Cable (A-B Type) x1

Your 1U4600 package should contain additional items:

- Power Cord
  - 1U4600R x1
- USB Cable (A-B Type) x1

Your N8800 series package should contain additional items:

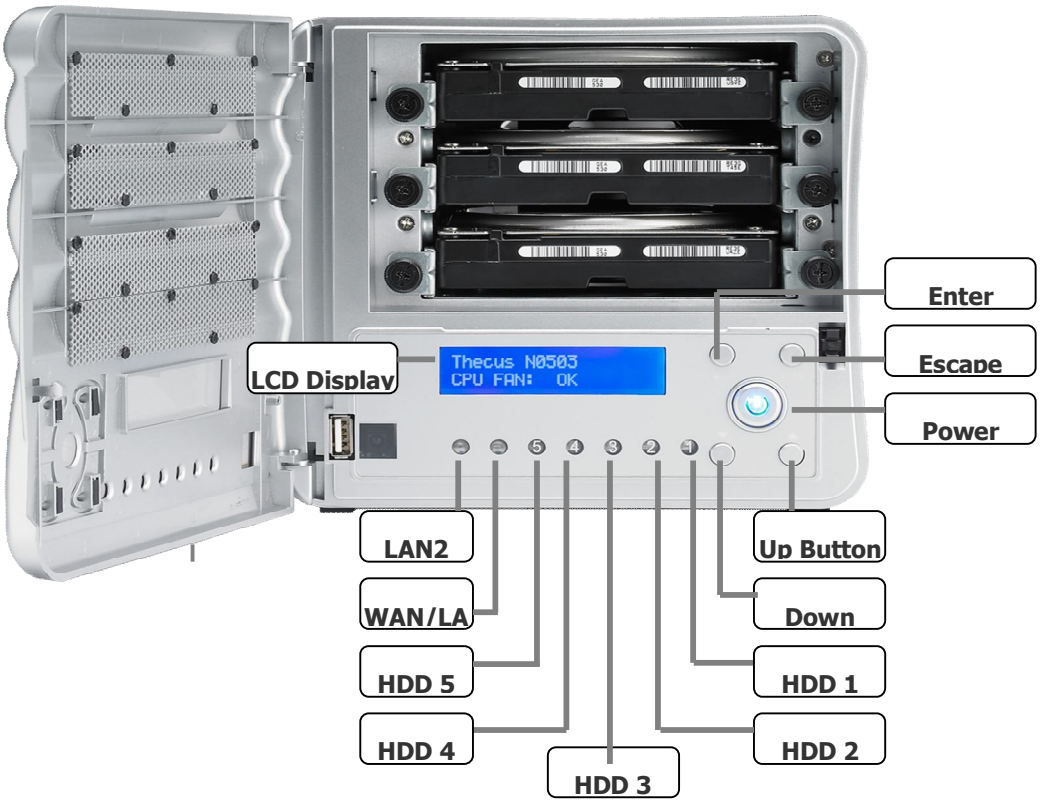
- Power Cord x1

Please check to see if your package is complete. If you find that some items are missing, contact your dealer.

Front Panel

N0503:

The Thecus N0503's front panel has the device's controls, indicators, and hard disk trays:



Front Panel	
Item	**Description**
Power LED	• **Solid blue:** system is powered on
WAN/LAN1 LED	• **Solid green:** network link • **Blinking orange:** network activity
LAN2 LED	• **Solid green:** network link • **Blinking orange:** network activity
HDD 1 LED	• **Solid red:** HDD failed • **Blinking orange:** HDD activity
HDD 2 LED	• **Solid red:** HDD failed • **Blinking orange:** HDD activity
HDD 3 LED	• **Solid red:** HDD failed • **Blinking orange:** HDD activity
HDD 4 LED	• **Solid red:** HDD failed • **Blinking orange:** HDD activity
HDD 5 LED	• **Solid red:** HDD failed • **Blinking orange:** HDD activity
USB Port	• USB 2.0 port for compatible USB devices, such as digital cameras, USB disks, USB printers, and USB wireless dongles* **Note**: For supported USB wireless dongles, please contact support@thecus.com
Power Button	• Power on/off N0503

	• **Solid blue:** Device is powered on
LCD Display	• Displays current system status and messages (Update time: 60 seconds).
Down Button ▼	• Push to scroll DOWN when using the LCD display
Up Button ▲	• Push to scroll UP when using the LCD display
Enter Button ↵	• Push to confirm information entered into the LCD display
Escape Button **ESC**	• Push to leave the current LCD menu

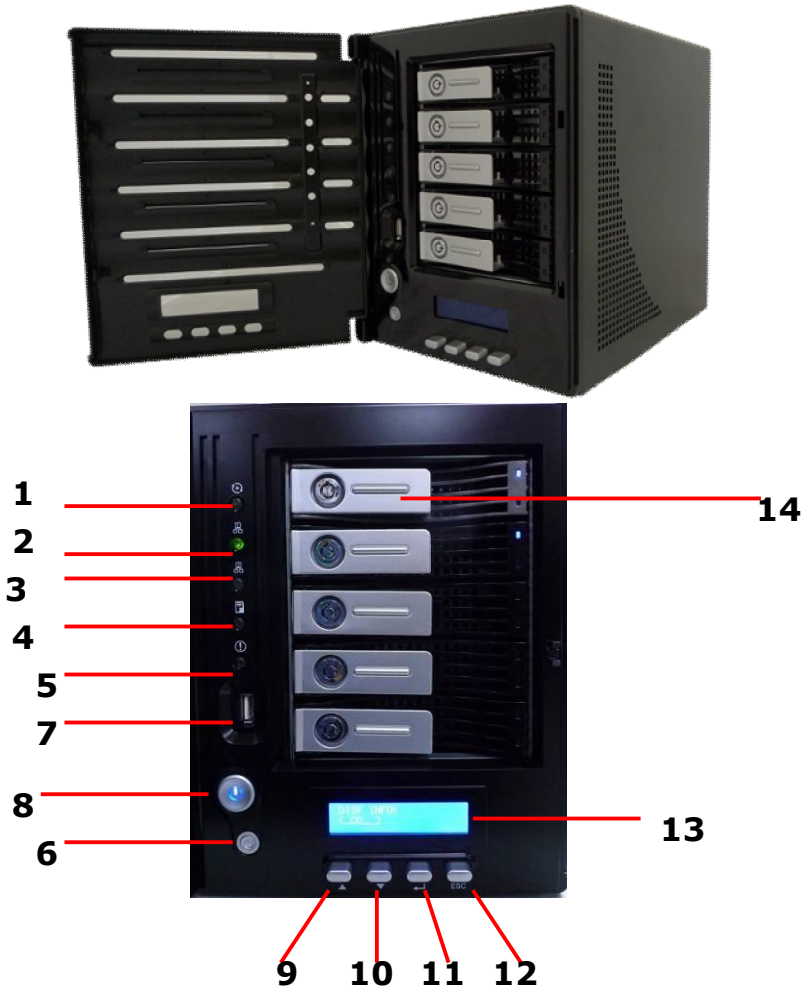
N4200 series:

The Thecus N4200series front panel has the device's controls, indicators, and hard disk trays:

Front Panel		
Item	**Description**	
Power Button	• Power on/off N4200series	
OLED	• Displays current system status and messages • OLED screen saver will be enabled after screen is left idle for more than 3 mins • OLED screen will be diabled after it is left idle for more than 6 mins	
OLED	HDD 1 LED	• **Yellow:** HDD activity • **Red:** HDD failure
	HDD 2 LED	• **Yellow:** HDD activity • **Red:** HDD failure
	HDD 3 LED	• **Yellow:** HDD activity • **Red:** HDD failure
	HDD 4 LED	• **Yellow:** HDD activity • **Red:** HDD failure
	WAN/LAN1 LED	• **Blinking green:** network activity
	LAN2 LED	• **Blinking green:** network activity
	USB Copy	• **Blue:** USB Copy activity • **Red:** USB Copy failure
HDD Tray	• Four HDD trays support 4x 3.5" or 4 x 2.5" HDDs	
USB Copy Button	• Copy USB storage contents to N4200series	
USB Port	• USB 2.0 port for compatible USB devices, such as USB disks.	

N5500:

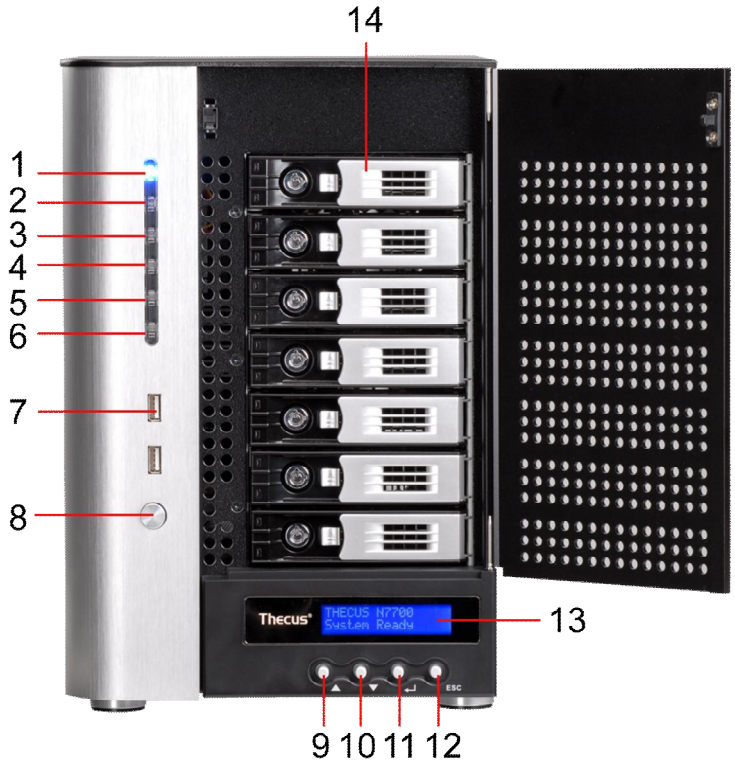
The Thecus N5500 front panel has the device's controls, indicators, and hard disk trays:



Front Panel	
Item	**Description**
1.System LED	• **Blinking orange:** system is being upgraded or system startup; data currently inaccessible
2.WAN/LAN1 LED	• **Solid green:** network link • **Blinking green:** network activity
3.LAN2 LED	• **Solid green:** network link • **Blinking green:** network activity
4.USB Copy LED	• **Solid blue:** files are being copied from a USB storage device
5.Syetem Warning LED	• **Solid RED:** System error.
6.Reset Button	• Reset system configuration to default value.
7.USB Port	• USB 2.0 port for compatible USB devices, such as USB disks.
8.Power Button/ Power LED	• Power on/off N5500 and Power LED. • **Solid blue:** System is power on.
9.Up Button ▲	• Push to scroll up when using the LCD display
10.Down Button ▼	• Push to enter USB copy operation screen
11.Enter Button ↵	• Push to enter LCD operate password for basic system setting
12.Escape Button **ESC**	• Push to leave the current LCD menu
13.LCD Display	• Displays current system status and warning messages
14.HDD Trays	• Five 3.5" SATA HDD trays • Locks are provided for added security

N7700 Series:

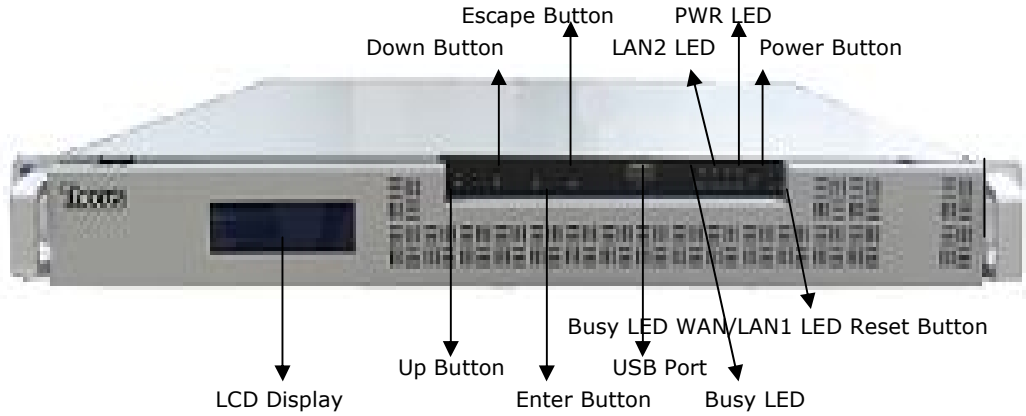
The Thecus N7700 series front panel has the device's controls, indicators, and hard disk trays:



Front Panel	
Item	**Description**
1.Power LED	• **Solid blue:** System is power on.
2.System LED	• **Solid orange:** system is being upgraded or system startup; data currently inaccessible
3.WAN/LAN1 LED	• **Solid green:** network link • **Blinking green:** network activity
4.LAN2 LED	• **Solid green:** network link • **Blinking green:** network activity
5.USB Copy LED	• **Solid blue:** files are being copied from a USB storage device
6.eSATA link LED	• **Solid blue:** external eSATA device has connected
7.USB Port	• USB 2.0 port for compatible USB devices, such as USB disks.
8.Power Button	• Power on/off N7700
9.Up Button ▲	• Push to scroll up when using the LCD display
10.Down Button ▼	• Push to enter USB copy operation screen
11.Enter Button ↵	• Push to enter LCD operate password for basic system setting
12.Escape Button **ESC**	• Push to leave the current LCD menu
13.LCD Display	• Displays current system status and warning messages
14.HDD Trays	• Seven 3.5" SATA HDD trays • Locks are provided for added security

1U4600:

The Thecus 1U4600 front panel has the device's controls, indicators, and hard disk trays:



Front Panel	
Item	**Description**
WAN/LAN1 LED	• **Solid green:** network link • **Blinking green:** network activity
LAN2 LED	• **Solid green:** network link • **Blinking green:** network activity
Busy LED	• **Blinking orange:** system startup or system maintenance; data currently inaccessible
USB Port	• USB 2.0 port for compatible USB devices, such as digital cameras, USB disks, and USB printers
Power Button	• Power on/off 1U4600 • **Solid blue:** Device is powered on • **Blinking blue:** eSATA hard disk is connected and active
Reset Button	• Resets the 1U4600 • Press for five seconds during boot process to reset IP address and admin password
HDD Trays	• Four 3.5" SATA HDD trays • Locks are provided for added security
LCD Display	• Displays current system status and warning messages • Displays hostname, WAN/LAN1/LAN2 IP address, RAID status, and current time
Up Button ▲	• Push to scroll up when using the LCD display
Down Button ▼	• Push to scroll down when using the LCD display
Enter Button ↵	• Push to confirm information entered into the LCD display
Escape Button **ESC**	• Push to leave the current LCD menu

N8800 series:

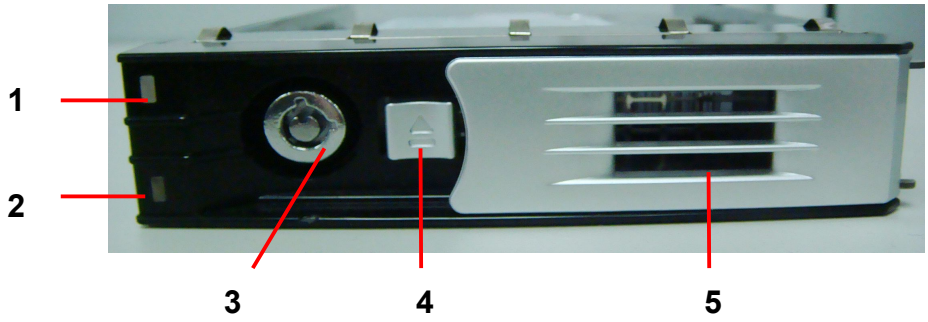
The Thecus N8800 series front panel has the device's controls, indicators, and hard disk trays:

Front Panel	
Item	**Description**
1.Power Button	• Power on/off N8800
2.Power LED	• **Solid green:** System is power on.
3.Reboot Button	• Press to system reboot
4.System fan alarm LED	• **Solid red:** system fan failure notification
5. Mute button	• Mute the system fan alarm.
6.USB Port	• USB 2.0 port for compatible USB devices, such as USB disks, USB printers, and USB wireless dongles* **Note**: For supported USB wireless dongles, please contact http://esupport.thecus.com/support
7.Up Button ▲	• Push to scroll up when using the LCD display
8.Down Button ▼	• Push to enter USB copy operation screen
9.Enter Button ↵	• Push to enter LCD operate password for basic system setting
10.Escape Button **ESC**	• Push to leave the current LCD menu

Hard Disk Trays

1U4600/N7700 series/N8800series:

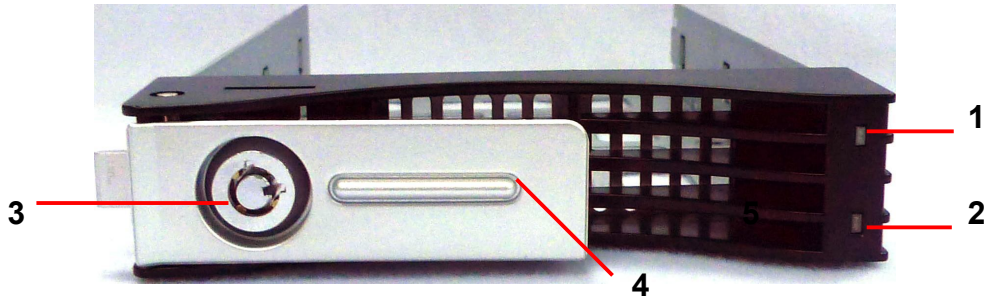
Each of mentioned above models hard disk trays has a lock, a latch, and two LED indicators:



Hard Disk Trays	
Item	**Description**
1.HDD Power LED	• **Solid blue:** hard disk is powered on
2.HDD Access/Error LED	• **Blinking green:** system is accessing data on the hard disk
3.Lock	• Use the lock to physically secure the hard disk to the unit
4.Latch	• Use to open and remove or close and secure the tray
5.Handle	• Pull out HDD tray

N4200 series/N5500:

Each of the N5500's hard disk trays has a lock, a latch, and two LED indicators:



Hard Disk Trays	
Item	**Description**
1.HDD Power LED	• **Solid blue:** hard disk is powered on
2.HDD Access/Error LED	• **Blinking green:** system is accessing data on the hard disk
3.Lock	• Use the lock to physically secure the hard disk to the unit
4.Handle	• Pull out HDD tray

N0503:

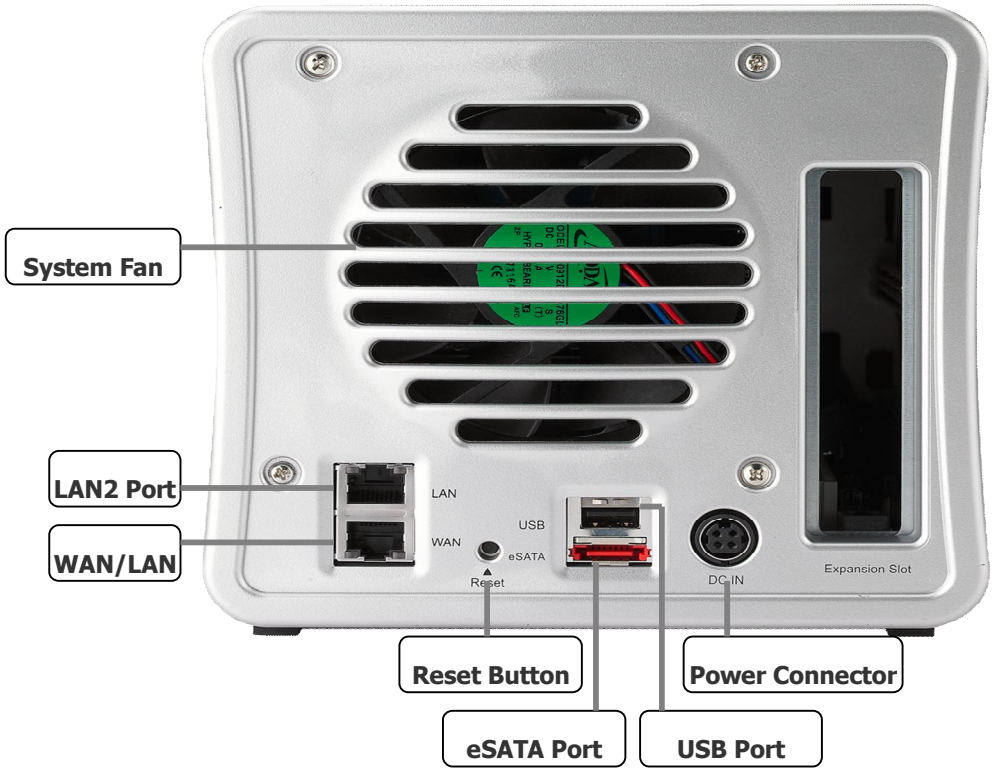
The N0503 supports both 2.5” and 3.5” Serial ATA (SATA) hard disks. To install a hard disk into the N0503, follow the steps below:

1. Open front door of the N0503.
2. For 3.5” HDD
    a. Get the hard drive rails and install them to your SATA hard disk(s).
    b. Slide hard disks into the N0503 until they snap into place.
    c. Replace the thumbscrews.
3. For 2.5” HDD
    a. It has come with 2.5” HDD cage
    b. Remove the 2.5” HDD tray
    c. Install HDD into
    d. Slide 2.5” HDD cage back in till it snap into place.
4. Replace the N0503 front cover.

Rear Panel

N0503:

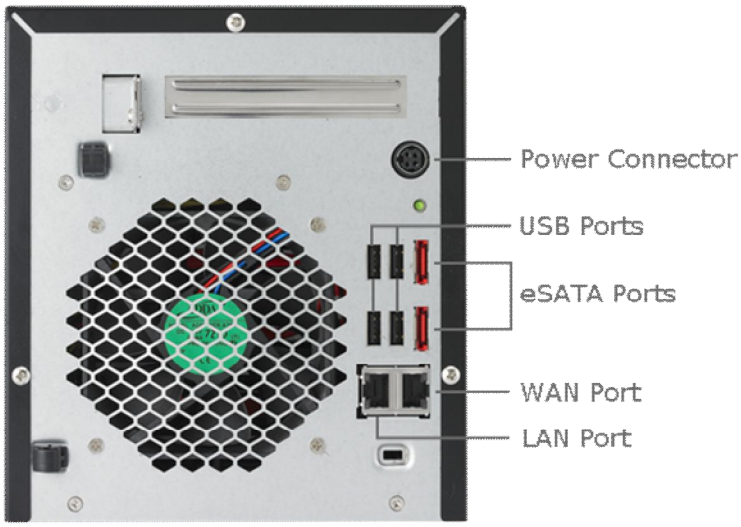
The N0503 rear panel features ports and connectors.



Back Panel	
Item	**Description**
eSATA Port	• eSATA port for high-speed storage expansion
USB Port	• USB 2.0 port for compatible USB devices, such as digital cameras, USB disks, and USB printers
WAN/LAN1 Port	• WAN/LAN1 port for connecting to an Ethernet network through a switch or router
LAN2 Port	• LAN2 port that can be used for connection sharing
System Fan	• System fan that exhausts heat from the unit
Power Connector	• Connect the included power cords to these connectors
Reset Button	• Resets the N0503 • Immediately press and hold the Reset button on the back for 5 seconds. This will reset your network setting, password, and turn off Jumbo Frame Support.

N4200 series:

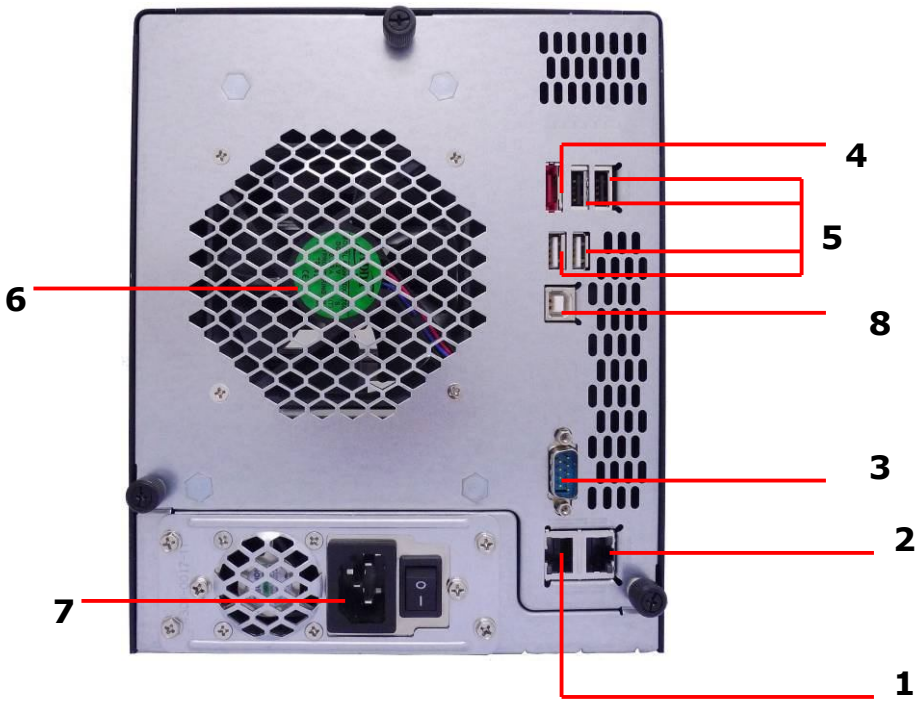
The N4200 rear panel features ports and connectors.



Back Panel	
Item	**Description**
Power Connector	• For connect the power adaptor
WAN/LAN1 Port	• WAN/LAN1 port for connecting to an Ethernet network through a switch or router
LAN2 Port	• LAN2 port for connecting to an Ethernet network through a switch or router
USB Ports	• USB 2.0 ports for storage expansion
eSATA Ports	• eSATA port for high-speed storage expansion

N5500:

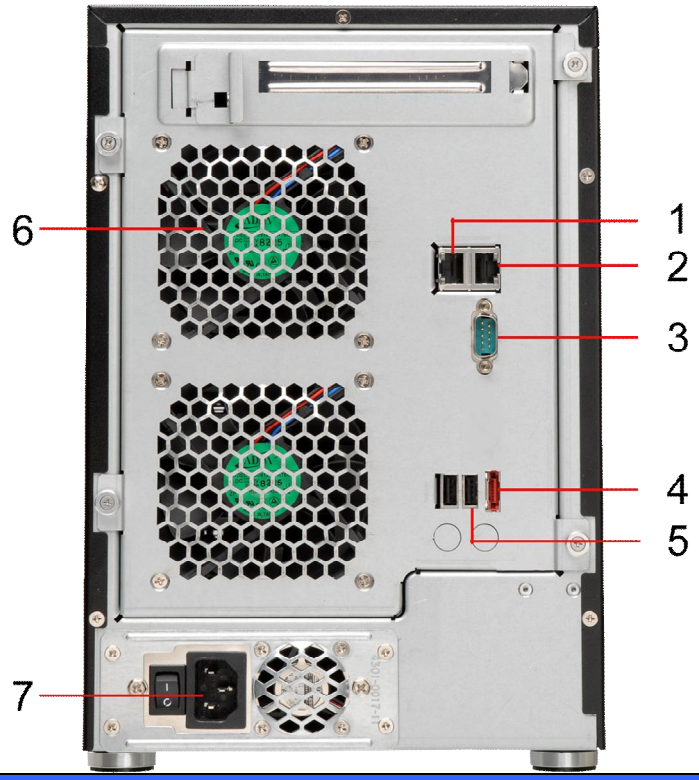
The N5500 rear panel features ports and connectors.



Back Panel	
Item	**Description**
1.WAN/LAN1 Port	• WAN/LAN1 port for connecting to an Ethernet network through a switch or router
2.LAN2 Port	• LAN2 port for connecting to an Ethernet network through a switch or router
3.Serial Port	• This port is for external UPS device
4.eSATA Port	• eSATA port for high-speed storage expansion
5.USB Port	• USB 2.0 port for compatible USB devices, such as USB disks, and USB printers
6.System Fan	• System fan that exhausts heat from the unit
7.Power Connector	• Connect the included power cords to these connectors
8.USB Port	• USB 2.0 port to connect PC (Type B of target mode)

N7700 series:

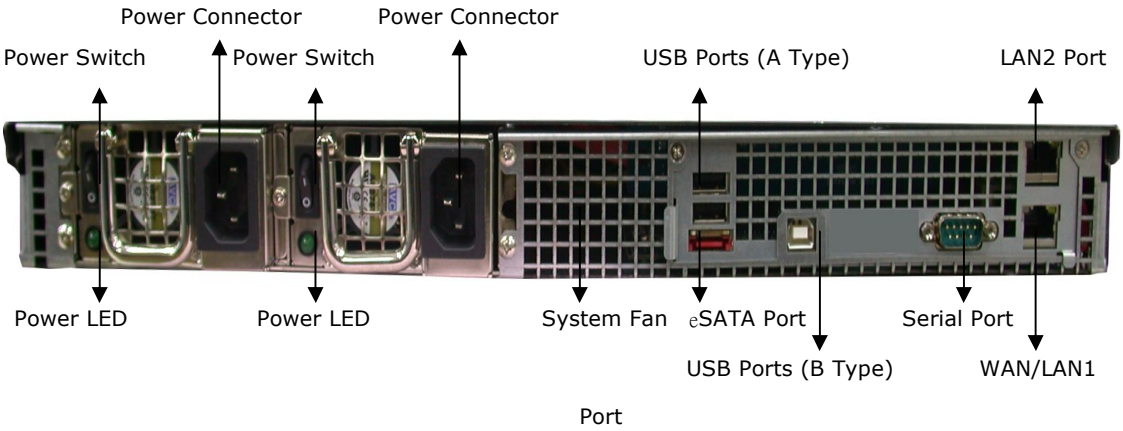
The N7700 rear panel features ports and connectors.



Back Panel	
Item	**Description**
1.LAN2 Port	• LAN2 port for connecting to an Ethernet network through a switch or router
2.WAN/LAN1 Port	• WAN/LAN1 port for connecting to an Ethernet network through a switch or router
3.Serial Port	• This port is for external UPS device
4.eSATA Port	• eSATA port for high-speed storage expansion
5.USB Port	• USB 2.0 port for compatible USB devices, such as USB disks, and USB printers
6.System Fan	• System fan that exhausts heat from the unit
7.Power Connector	• Connect the included power cords to these connectors

1U4600R:

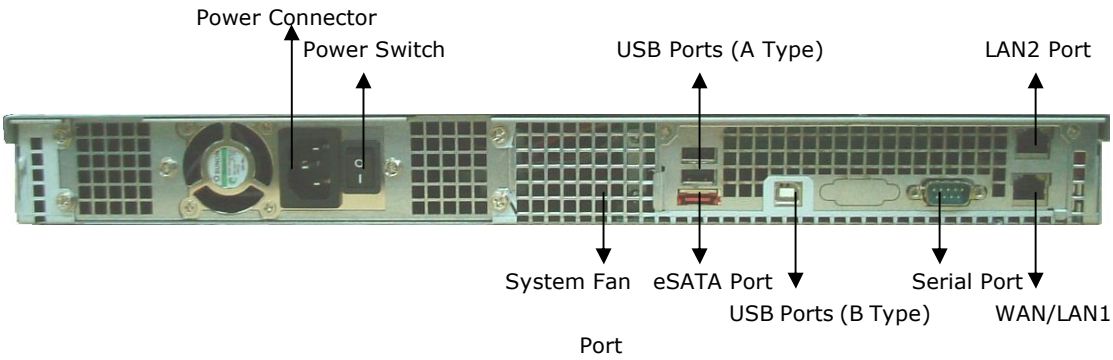
The rear panel of the 1U4600R houses most of the USB and Ethernet connections, as well as the eSATA port, system fan, and power connector. See the table below for descriptions of each:



1U4600 Back Panel	
Item	**Description**
eSATA Port	• eSATA port for high-speed storage expansion
USB Ports	• USB 2.0 ports for compatible USB devices, such as digital cameras, USB disks, and USB printers
WAN/LAN1 Port	• WAN/LAN1 port for connecting to an Ethernet network through a switch or router
LAN2 Port	• LAN2 port that can be used for connection sharing
Power Switch	• Switch for power supply
System Fan	• System fan that exhausts heat from the unit
Serial Port	• This port is for factory use only
Power Connector	• Connect the included power cords to these connectors

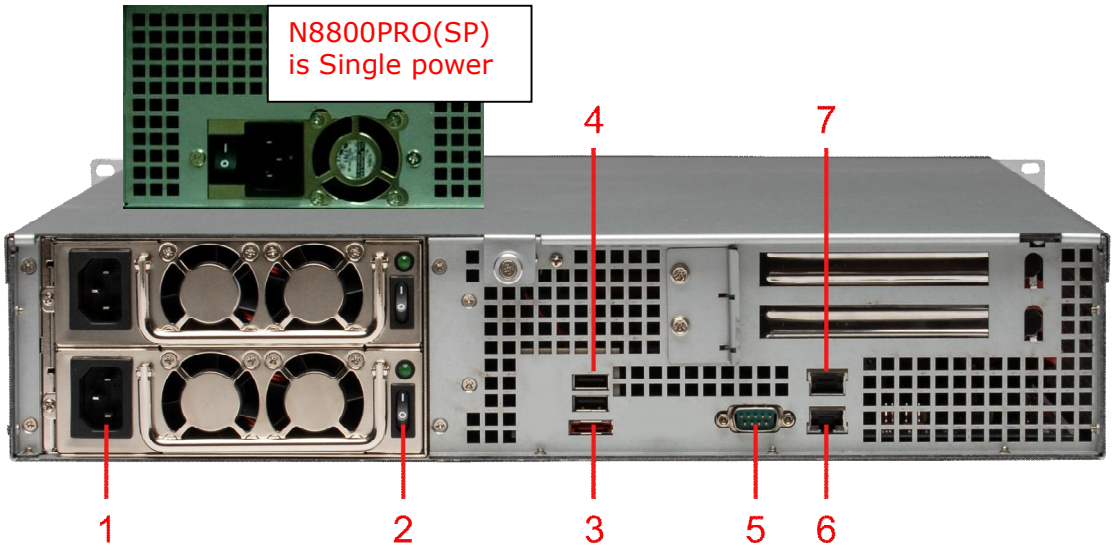
1U4600S:

The rear panel of the 1U4600S is similar to the 1U4600R, but with a single power connector:



N8800 series:

The N8800 rear panel features ports and connectors.



Back Panel	
Item	**Description**
1.Power Connector	• Connect the included power cords to these connectors
2.Power Switch	• Switch for power supply
3.eSATA Port	• eSATA port for high-speed storage expansion
4.USB Port	• USB 2.0 port for compatible USB devices, such as USB disks, and USB printers
5.Serial Port	• This port is for external UPS device
6.WAN/LAN1 Port	• WAN/LAN1 port for connecting to an Ethernet network through a switch or router
7.LAN2 Port	• WAN/LAN1 port for connecting to an Ethernet network through a switch or router

Chapter 2: Hardware Installation

Overview

Your Thecus IP storage is designed for easy installation. To help you get started, the following chapter will help you quickly get your Thecus IP storage up and running. Please read it carefully to prevent damaging your unit during installation.

Before You Begin

Before you begin, be sure to take the following precautions:

1. Read and understand the ***Safety Warnings*** outlined in the beginning of the manual.

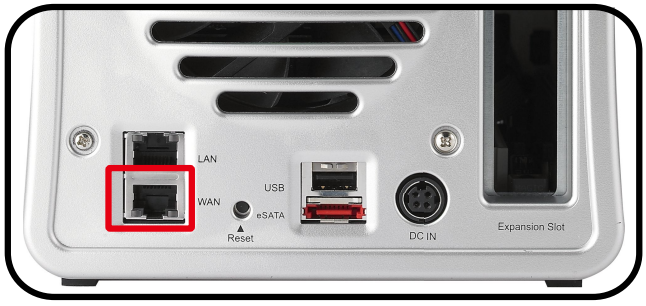
2. If possible, wear an anti-static wrist strap during installation to prevent static discharge from damaging the sensitive electronic components on the N8800.

3. Be careful not to use magnetized screwdrivers around the Thecus IP storage's electronic components.

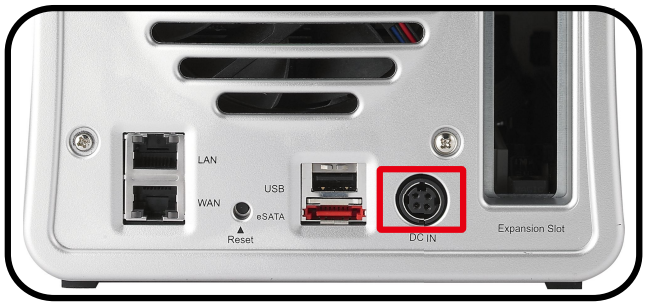
Cable Connections

To connect the N0503 to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the WAN/LAN1 port on the back panel of the N0503.



2. Connect the provided power cord into the power socket on the back panel. Plug the other end of the cord into a surge protector socket.



3. Open the front door then press the power button boot up the N0503.

To connect the N4200 series product to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the WAN/LAN1 port on the back panel of the N4200.

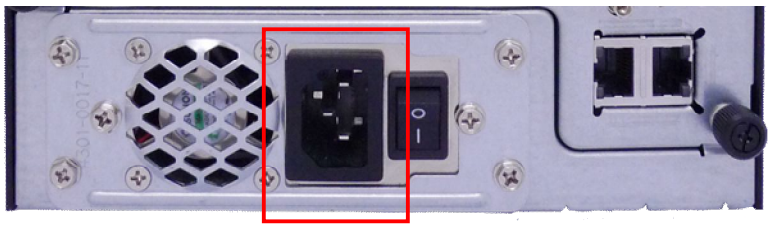
2. Connect the provided power cord into the universal power socket on the back panel. Plug the other end of the cord into a surge protector socket.

3. Press the power button on the Front Panel to boot up the N4200.

To connect the N5500 to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the WAN/LAN1 port on the back panel of the N5500.

2. Connect the provided power cord into the universal power socket on the back panel. Plug the other end of the cord into a surge protector socket. Press the power supply switch to turn on the power supply.



3. Press the power button on the Front Panel to boot up the N5500.

To connect the 1U4600 to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the WAN/LAN1 port on the back panel of the 1U4600.

2. Connect the provided power cord into the universal power socket on the back panel. Plug the other end of the cord into a surge protector socket. Press the power supply switch to turn on the power supply.

NOTE

If you are installing the 1U4600R, be sure to connect both power cables. If you do not, the system will assume one power supply has failed, and an alarm will sound.

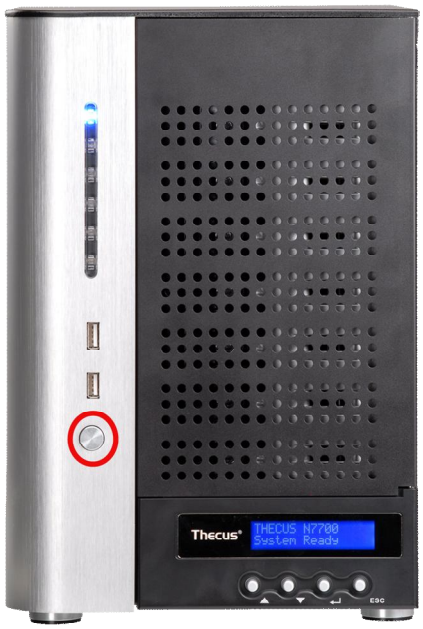
3. Press the power button on the Front Panel to boot up the 1U4600.

To connect the N7700 series products to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the WAN/LAN1 port on the back panel of the N7700.

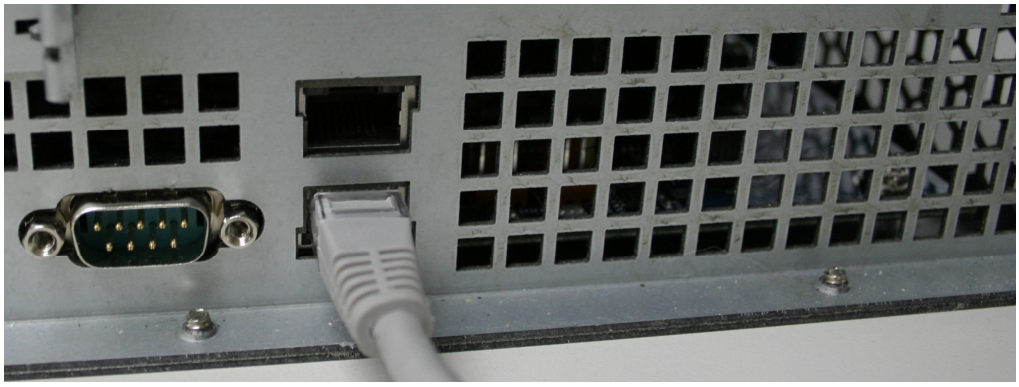
2. Connect the provided power cord into the universal power socket on the back panel. Plug the other end of the cord into a surge protector socket. Press the power supply switch to turn on the power supply.

3. Press the power button on the Front Panel to boot up the N7700.



To connect the N8800 series products to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the WAN/LAN1 port on the back panel of the N8800.



2. Connect the provided power cord into the universal power socket on the back panel. Plug the other end of the cord into a surge protector socket. Press the power supply switch to turn on the power supply.

3. Press the power button on the Front Panel to boot up the N8800.

Chapter 3: First Time Setup

Overview

Once the hardware is installed, physically connected to your network, and powered on, you can configure the Thecus IP storage so that it is accessible to your network users. There are two ways to set up your Thecus IP storage: using the **Thecus Setup Wizard** or the **LCD display**. Follow the steps below for initial software setup.

Thecus Setup Wizard

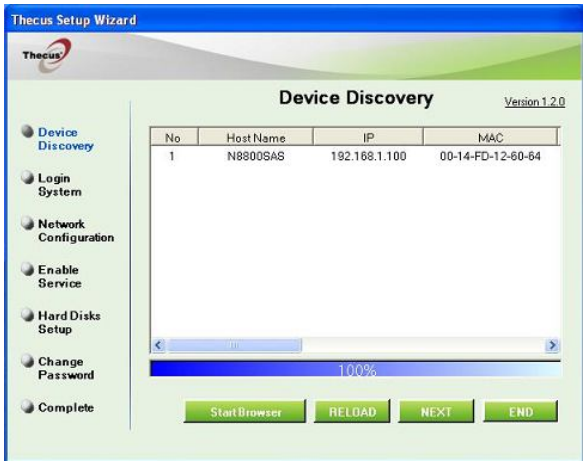
The handy Thecus Setup Wizard makes configuring Thecus IP storage a snap. To configure the Thecus IP storage using the Setup Wizard, perform the following steps:

1. Insert the installation CD into your CD-ROM drive (the host PC must be connected to the network).

2. The Setup Wizard should launch automatically. If not, please browse your CD-ROM drive and double click on **Setup.exe.**

NOTE For MAC OS X users, double click on Thecus Setup Wizard .dmg file.

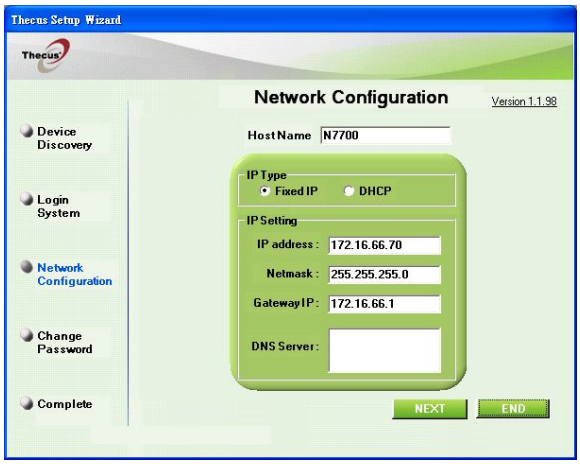
3. The Setup Wizard will start and automatically detect all Thecus storage devices on your network. If none are found, please check your connection and refer to **Chapter 7: Troubleshooting** for assistance.



4. Select the Thecus IP storage that you like to configure.

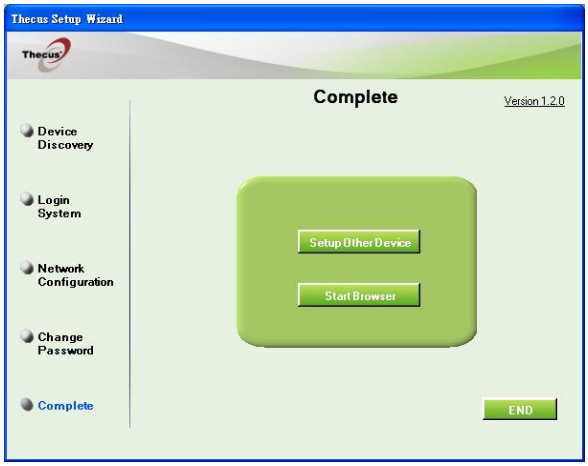
5. Login with the administrator account and password. The default account and password are both "admin".

6. Name your Thecus IP storage and configure the network IP address. If your switch or router is configured as a DHCP Server, configuring the Thecus IP storage to automatically obtain an IP address is recommended. You may also use a static IP address and enter the DNS Server address manually.



7. Change the default administrator password.

8. Finished! Access the Thecus IP storage Web Administrator Interface by pressing the ***Start Browser*** button. You can also configure another Thecus IP storage at this point by clicking the ***Setup Other Device*** button. Press ***Exit*** to exit the wizard.



NOTE

The Thecus Setup Wizard is designed for installation on systems running Windows XP/2000/vista/7 or Mac OSX or later. Users with other operating systems will need to install the Thecus Setup Wizard on a host machine with one of these operating systems before using the unit.

LCD Operation (N5500/1U4600/N7700 series/N8800 series)

The mentioned models above are equipped with an LCD on the front for easy status display and setup. There are four buttons on the front panel to control the LCD functions.

LCD Controls

Use the **Up** (▲), **Down** (▼), **Enter** (↵) and **Escape** (**ESC**) keys to select various configuration settings and menu options for Thecus IP storage configuration.

The following table illustrates the keys on the front control panel:

LCD Controls		
Icon	**Function**	**Description**
▲	Up Button	Select the previous configuration settings option.
▼	Down Button	USB copy confirmation display.
↵	Enter	Enter the selected menu option, sub-menu, or parameter setting.
ESC	Escape	Escape and return to the previous menu.

There are two modes of operation for the LCD: **Display Mode** and **Management Mode**.

Display Mode

During normal operation, the LCD will be in **Display Mode**.

Display Mode	
Item	**Description**
Host Name	Current host name of the system.
WAN/LAN1	Current WAN/LAN1 IP setting.
LAN2	Current LAN2 IP setting.
Link Aggregation	Current Link Aggregation status
System Fan1	Current system fan1 status.
System Fan2	Current system fan2 status.

CPU Fan	Current CPU fan status
2009/05/22 12:00	Current system time.
Disk Info	Current status of disk slot has been installed
RAID	Current RAID status.

The Thecus IP storage will rotate these messages every one-two seconds on the LCD display.

USB Copy

The USB Copy function enables you to copy files stored on USB devices such as USB disks and digital cameras to the N8800 by press button. To use USB copy, follow the steps below:

1. Plug your USB device into an available USB port on the Front end.
2. In **Display Mode**, press the **Down Button** (▼).
3. The LCD will display "`USB Copy?`"
4. Press **Enter** (↵) and the N8800 will start copying USB disks connected to the front USB port.
5. All of data will be copied into system folder named "USB copy".

Management Mode

During setup and configuration, the LCD will be in **Management Mode**.

To enter into Management Mode, press **Enter (↵)** and an "*Enter Password*" prompt will show on the LCD.

At this time, the administrator has to enter the correct LCD password. System will check whether the correct LCD password has been entered. The default LCD password is " `0000` ". If correct password is entered, you will enter into the **Management Mode** menu.

Management Mode	
Item	**Description**
WAN/LAN1 Setting	IP address and netmask of your WAN/LAN1 ports.
LAN2 Setting	IP address and netmask of your LAN2 ports.
Link Agg. Setting	Select **Load Balance, 802.3ad** or **Failover**.
Change Admin Passwd	Change administrator's password for LCD operation.
Reset to Default	Reset system to factory defaults.
Exit	Exit **Management Mode** and return to **Display Mode**.

NOTE

You can also change your LCD password using the Web Administration Interface by navigating to **System Management >Utility> Administrator Password**. For more on the Web Administration Interface, see **Chapter 4: System Management**.

LCD Operation (N0503)

LCD Controls

Use the **Down** (▼), **Up** (▲), **Enter** (↵) and **Escape** (**ESC**) keys to operate LCD to view system information and USB copy.

The following table illustrates the keys on the front control panel:

LCD Controls		
Icon	**Function**	**Description**
▼	Down Button	Select the previous configuration settings option.
▲	Up Button	Select the next configuration settings option.
↵	Enter	Enter to display USB copy operation.
ESC	Escape	Escape to give up USB copy. Press and hold for 3 seconds to turn off the LCD's backlight. Press any button to switch the backlight back on.

Display Mode

During normal operation, the LCD will be in **Display Mode**.

Display Mode	
Item	**Description**
Host Name	Current host name of the system.
WAN/LAN1	Current WAN/LAN1 IP setting.
LAN2	Current LAN2 IP setting.
RAID	Current RAID status.
System Fan	Current system fan status.
Temperature	Current system temperature.
Date/Time	Current system date and time
Up Time	The system power on time since last start

The N0503 will rotate these messages every three seconds on the LCD display.

NOTE If the RAID array is in a degraded state, the LCD display will be stopped in display mode and show which disk is degraded in the array:

USB Copy

The USB Copy function enables you to copy files stored on USB devices such as USB disks and digital cameras to the N0503 with a press of a button. To use USB copy, follow the steps below:

1. Plug your USB device into an available USB port on the Front Panel.
2. In **Display Mode**, press the **Enter** (↵).
3. The LCD will display "**USB Copy?**"
4. Press **Enter** (↵) and the N0503 will start copying USB disks connected to the front USB port. The LCD will display the USB copy progress and results.

OLED Operation (N4200 series)

OLED Operation

The N4200 series is equipped with an OLED on the front for easy status display and setup. There are four buttons on the front panel to control the OLED functions.

OLED Controls

Use the **Up** (▲), **Down** (▼), **Enter** (↵) and **Escape** (**ESC**) keys to select various configuration settings and menu options for N4200series configuration.

The following table illustrates the keys on the front control panel:

OLED Controls		
Icon	**Function**	**Description**
▲	Up Button	Select the previous configuration settings option.
▼	Down Button	USB copy confirmation display.
↵	Enter	Enter the selected menu option, sub-menu, or parameter setting.
ESC	Escape	Escape and return to the previous menu.

There are two modes of operation for the OLED: **Display Mode** and **Management Mode**.

Display Mode

During normal operation, the OLED will be in **Display Mode**.

Display Mode	
Item	**Description**
Host Name	Current host name of the system.
WAN/LAN1	Current WAN/LAN1 IP setting.
LAN2	Current LAN2 IP setting.
Link Aggregation	Current Link Aggregation status
System Fan	Current system fan status.
CPU Fan	Current CPU fan status
2009/05/22 12:00	Current system time.
RAID	Current RAID status.

The N4200 series will rotate these messages every one-two seconds on the OLED display.

Typical Setup Procedure

From the Web Administration Interface, you can begin to setup your Thecus IP storage for use on your network. Setting up the Thecus IP storage typically follows the five steps outlined below.

For more on how to use the Web Administration Interface, see
Chapter 4: Web Administration Interface.

Step 1: Network Setup

From the Web Administration Interface, you can configure the network settings of the Thecus IP storage for your network. You can access the **Network** menu from the menu bar.
For details on how to configure your network settings, refer to
Chapter 4: System Network .

Step 2: RAID Creation

Next, administrators can configure their preferred RAID setting and build their RAID volume. You can access RAID settings from the menu bar of the Web Administration Interface by navigating to **Storage Management > RAID Configuration.**

For more information on configuring RAID, see
Chapter 4: System Management > RAID Configuration.

Don't know which RAID level to use? Find out more about the different RAID levels from **Appendix B: RAID Basics**.

Step 3: Create Local Users or Setup Authentication

Once the RAID is ready, you can begin to create local users for Thecus IP storage, or choose to setup authentication protocols such as Active Directory (AD).

For more on managing users, go to **Chapter 4:User and Group Authentication**.

For more information on configuring Active Directory, see
Chapter 4: User and Group Authentication > ADS/NT Support.

For information about the benefits of Active Directory, see **Appendix C: Active Directory Basics**.

Step 4: Create Folders and Set Up ACLs

Once users are introduced into your network, you can begin to create various folders on the Thecus IP storage and control user access to each using Folder Access Control Lists.

More information on managing folders, see
Chapter 4: Storage Management > Share Folder .

To find out about configuring Folder Access Control Lists, see **Chapter 4: Storage Management > Share Folder> Folder Access Control List (ACL)**.

Step 5: Start Services

Finally, you can start to setup the different services of Thecus IP storage for the users on your network. You can find out more about each of these services by clicking below:

SMB/CIFS

Apple File Protocol (AFP)

Network File System (NFS)

File Transfer Protocol (FTP)

iTunes Server

Printer Server

Photo Server

Chapter 4: System Administration

Overview

The Thecus IP storage provides an easily accessible **Web Administration Interface**. With it, you can configure and monitor the Thecus IP storage anywhere on the network.

Web Administration Interface

Make sure your network is connected to the Internet. To access Thecus IP storage **Web Administration Interface**:

1. Type the Thecus IP storage IP address into your browser. (Default IP address is `http://192.168.1.100`)

NOTE

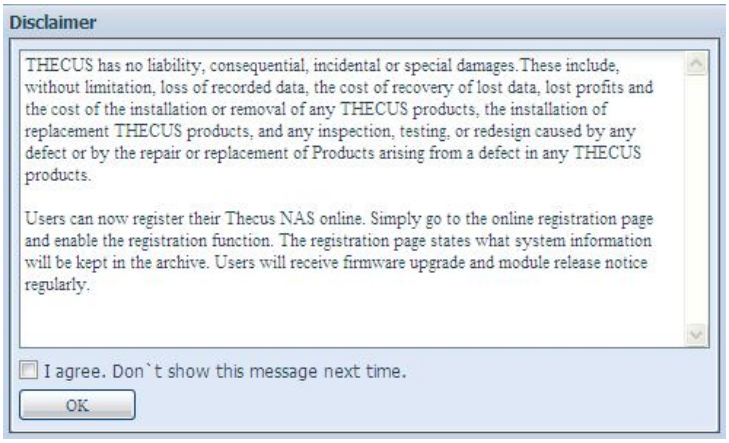
Your computer's network IP address must be on the same subnet as the Thecus IP storage. If the Thecus IP storage has default IP address of 192.168.1.100, your managing PC IP address must be 192.168.1.x, where x is a number between 1 and 254, but not *100*.

2. Login to the system using the administrator user name and password. The factory defaults are:

   User Name: `admin`
   Password: `admin`

※ If you changed your password in the setup wizard, use the new password.

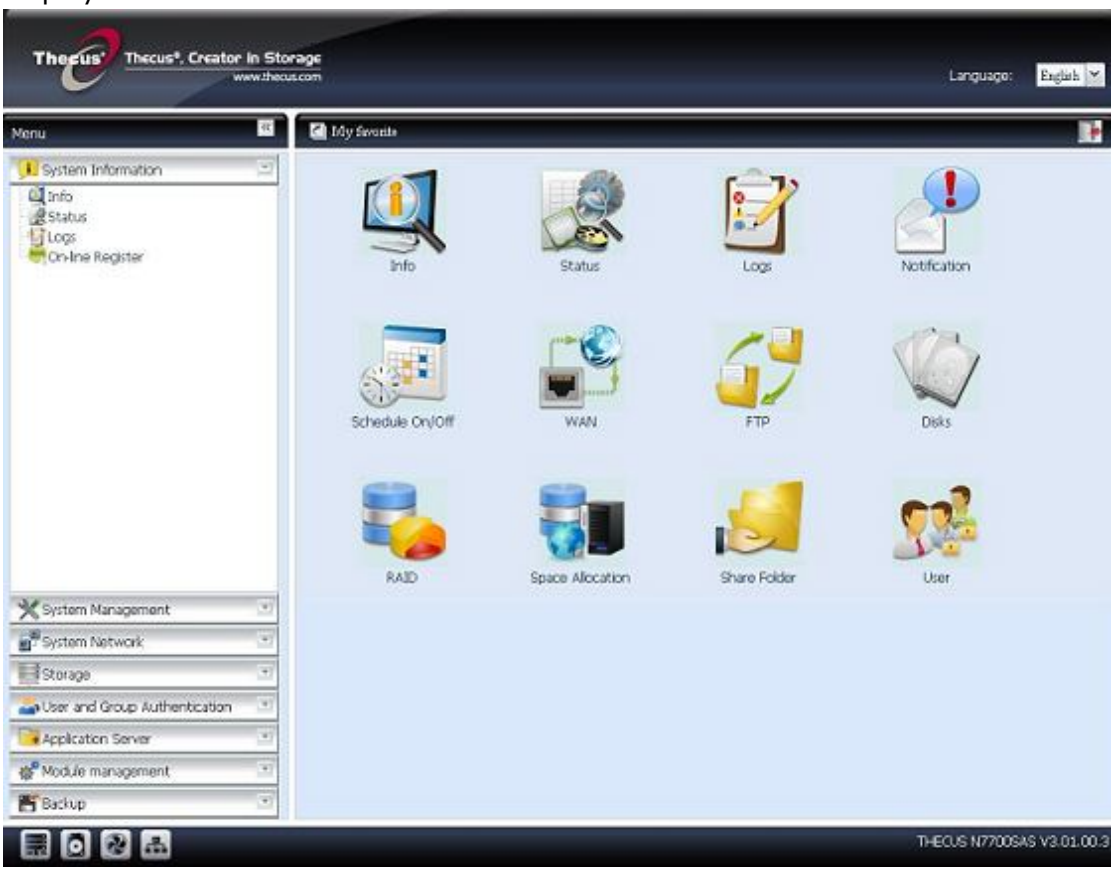
Once you are logged in as an administrator disclaimer page will appear as below. Please click the check box if you do not want to have this page displayed during the next login.


Disclaimer
THECUS has no liability, consequential, incidental or special damages.These include, without limitation, loss of recorded data, the cost of recovery of lost data, lost profits and the cost of the installation or removal of any THECUS products, the installation of replacement THECUS products, and any inspection, testing, or redesign caused by any defect or by the repair or replacement of Products arising from a defect in any THECUS products.
Users can now register their Thecus NAS online. Simply go to the online registration page and enable the registration function. The registration page states what system information will be kept in the archive. Users will receive firmware upgrade and module release notice regularly.
I agree. Don`t show this message next time.
OK

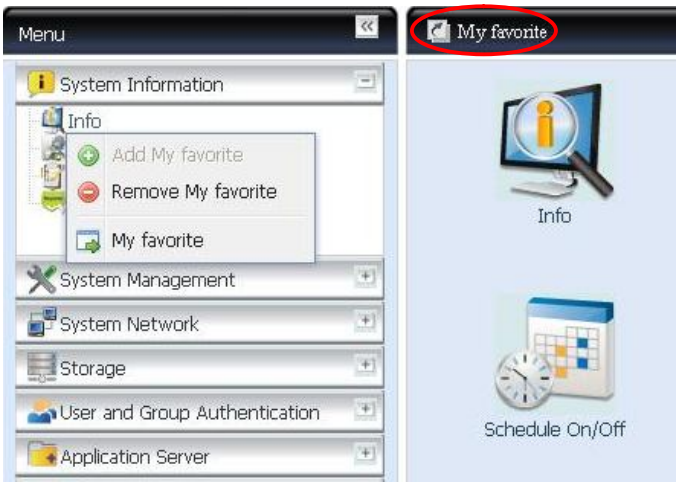
Following by disclaim page, you will see the **Web Administration Interface**. From here, you can configure and monitor virtually every aspect of the Thecus IP storage from anywhere on the network.

My Favorite

The user interface with "My Favorite" shortcut is allowed user to designate often used items and have them display on the main screen area. The figure below displays 12 default favorite functions.



Administrators can add or remove favorite functions to My Favorites by right clicking the mouse on the menu tree.



The other way administrators can add favorite functions is by clicking the "Add Favorite" icon in each function screen. Please refer figure below in red circuit icon.

To return to the favorite screen, simply click "My Favorite" located at the left hand corner of the main screen.

Menu Bar

The **Menu Bar** is where you will find all of the information screens and system settings of Thecus IP storage. The various settings are placed in the following groups on the menu bar:

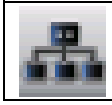
Menu Bar	
Item	**Description**
System Information	Current system status of the Thecus IP storage.
System Management	Various Thecus IP storage system settings and information.
System Network	Information and settings for network connections, as well as various services of the Thecus IP storage.
Storage	Information and settings for storage devices installed into the Thecus IP storage.
User and Group Authentication	Allows configuration of users and groups.
Application Server	Printer Server and iTunes Server to set up of the Thecus IP storage.
Module Management	System and user Module to install of the Thecus IP storage.
Backup	Category of Backup Features set up of the Thecus IP storage.

Moving your cursor over any of these items will display the dropdown menu selections for each group.

In the following sections, you will find detailed explanations of each function, and how to configure your Thecus IP storage.

Message Bar

You can get information about system status quickly by moving mouse over.

Message Bar		
Item	**Status**	**Description**
	RAID Information.	Display the status of created RAID volume. Click to go to RAID information page as short cut.
	Disks Information.	Display the status of disks installed in the system. Click to go to Disk information page as short cut.
	FAN.	Display system FAN Status. Click to go to System Status page as short cut.
	Network.	Green: Connection to network is normal. Red: abnormal connection to the network

Logout

Click to logout Web Administration Interface.

Language Selection

The Thecus IP storage supports multiple Languages, including:

- English
- Japanese
- Traditional Chinese
- Simplified Chinese
- French
- German
- Italian
- Korean
- Spanish
- Russia
- Polish
- Portugal

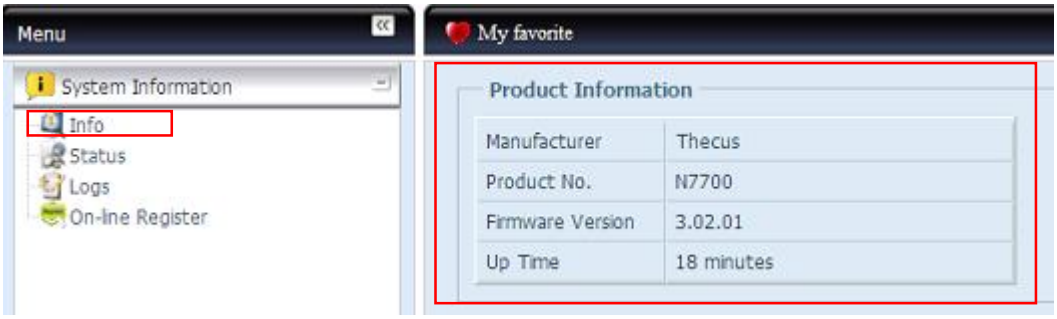
On the menu bar, click **Language** and the **selection** list appears. This user interface will switch to selected Language for Thecus IP storage.

System Information

Information provides viewing on current Product info, System Status, Service Status and Logs.
The menu bar allows you to see various aspects of the Thecus IP storage. From here, you can discover the status of the Thecus IP storage, and also other details.

Product Information

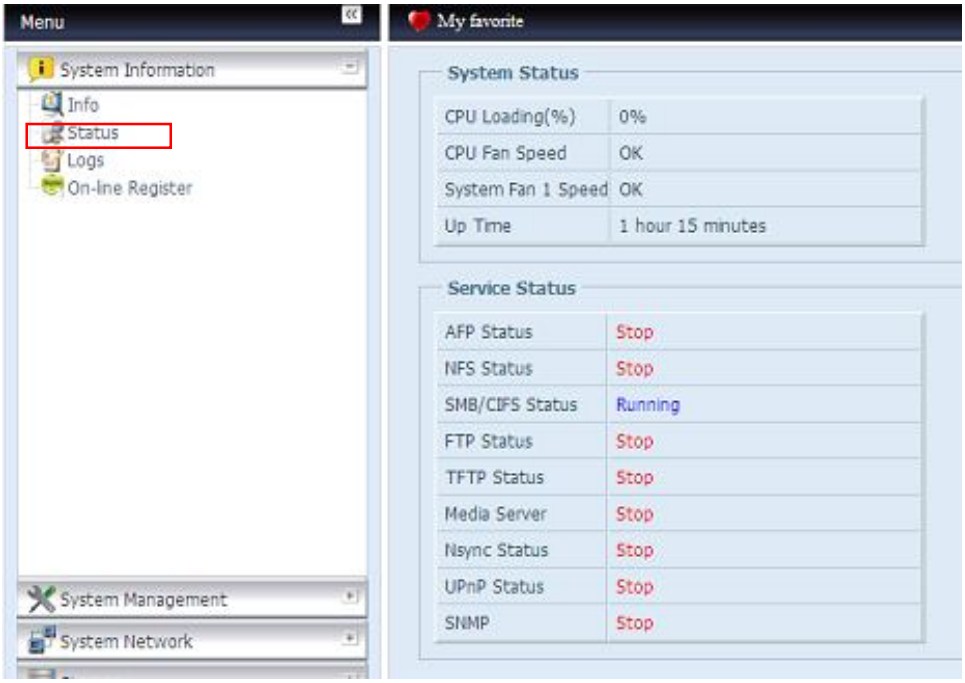
Once you login, you will first see the basic **Product Information** screen providing **Manufacturer**, **Product No.**, **Firmware Version**, and **System Up Time** information.



Product Information	
Item	**Description**
Manufacturer	Displays the name of the system manufacturer.
Product No.	Shows the model number of the system.
Firmware version	Shows the current firmware version.
Up time	Displays the total run time of the system.

System/Service Status

From the **Status** menu, choose the ***System*** item, **System Status** and **Service Status** screens appear. These screens provide basic system and service status information.

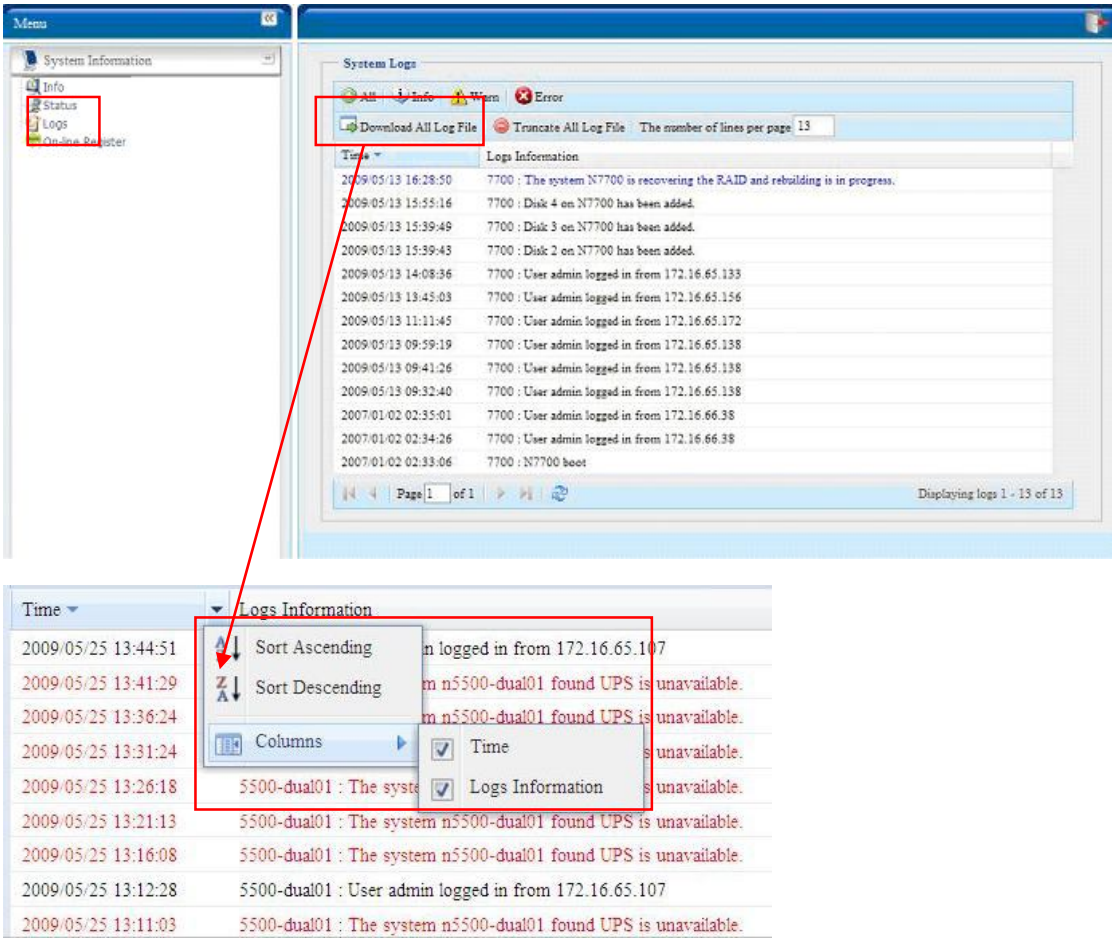


System Status	
Item	**Description**
CPU Loading (%)	Displays current CPU workload of the Thecus IP storage.
CPU Fan Speed	Displays current CPU fan status.
System Fan Speed	Displays the current status of the system fan.
Up Time	Shows how long the system has been up and running.

Service Status	
Item	**Description**
AFP Status	The status of the Apple Filing Protocol server.
NFS Status	The status of the Network File Service Server.
SMB/CIFS Status	The status of the SMB/CIFS server.
FTP Status	The status of the FTP server.
TFTP Status	The status of the TFTP server.
Media Server	The status of the Media Server
Nsync Status	The status of the Nsync server.
UPnP Status	The status of the UPnP service.
SNMP	The status of the SNMP service.

Logs

From the **System Information** menu, choose the **Logs** item and the **System Logs** screen appears. This screen shows a history of system usage and important events such as disk status, network information, and system booting. See the following table for a detailed description of each item:

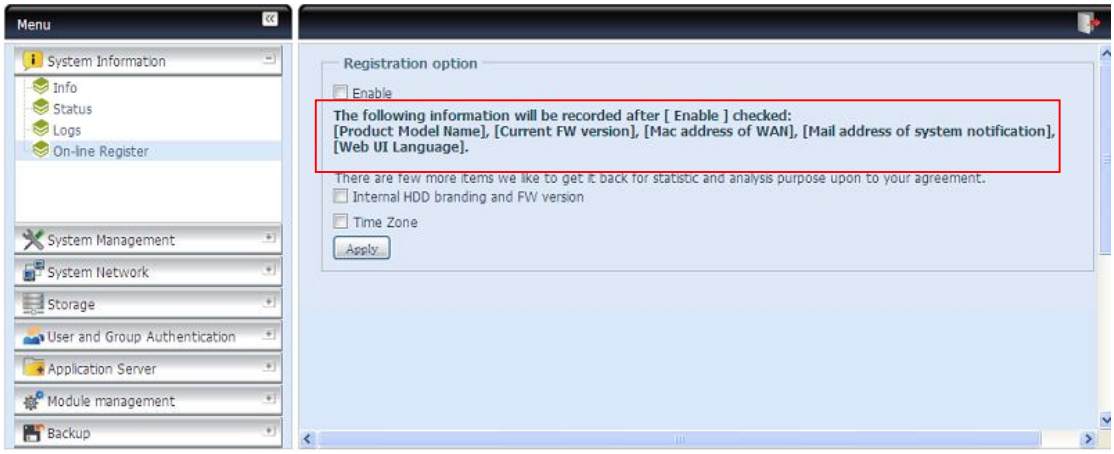


See the following table for a detailed description of each item:

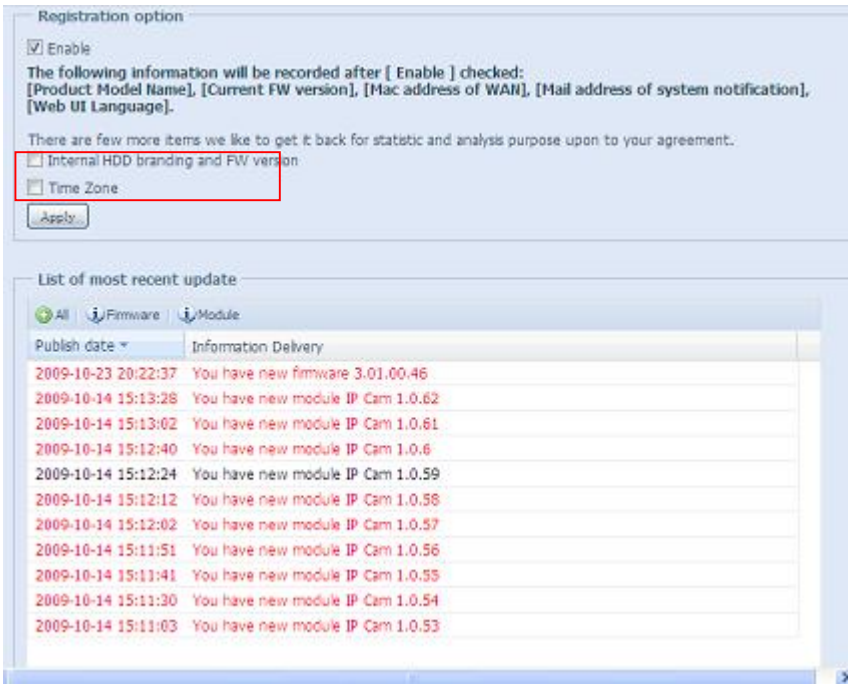
System Logs	
Item	**Description**
All	Provides all log information including system messages, warning messages and error messages.
INFO	Records information about system messages.
WARN	Shows only warning messages.
ERROR	Shows only error messages.
Download All Log File	Export all logs to an external file.
Truncate All Log File	Clear all log files.
The number of lines per page ☐	Specify desired number of lines to display per page.
Sort Ascending	Shows logs by date in ascending order.
Sort Descending	Shows logs by date in descending order.
|<< < > >>|	Use the forward (**>** **>>|**) and backward (**|<<** **<**) buttons to browse the log pages.
	Re-loading logs.

On-line Register

From the **System Information** menu, choose the **On-line Register** item and the **System On-line Register** screen appears. The on-line register service can periodically update the user when new firmware and software modules are released by Thecus. To enable this service, simply check the "Enable" check box. By enabling this service, the items in bold will be sent to Thecus via the Internet.


Menu
System Information
Info
Status
Logs
On-line Register
System Management
System Network
Storage
User and Group Authentication
Application Server
Module management
Backup
Registration option
Enable
The following information will be recorded after [Enable] checked:
[Product Model Name], [Current FW version], [Mac address of WAN], [Mail address of system notification], [Web UI Language].
There are few more items we like to get it back for statistic and analysis purpose upon to your agreement.
Internal HDD branding and FW version
Time Zone
Apply

Other than the defined items sent upon registration, there are also two additional items: "HDD Info" and "Time Zone". These two optional items can also be sent to Thecus anonymously for analysis and statistics purposes. To send these items, simply check the desired checkboxes to help Thecus improve its products and services.

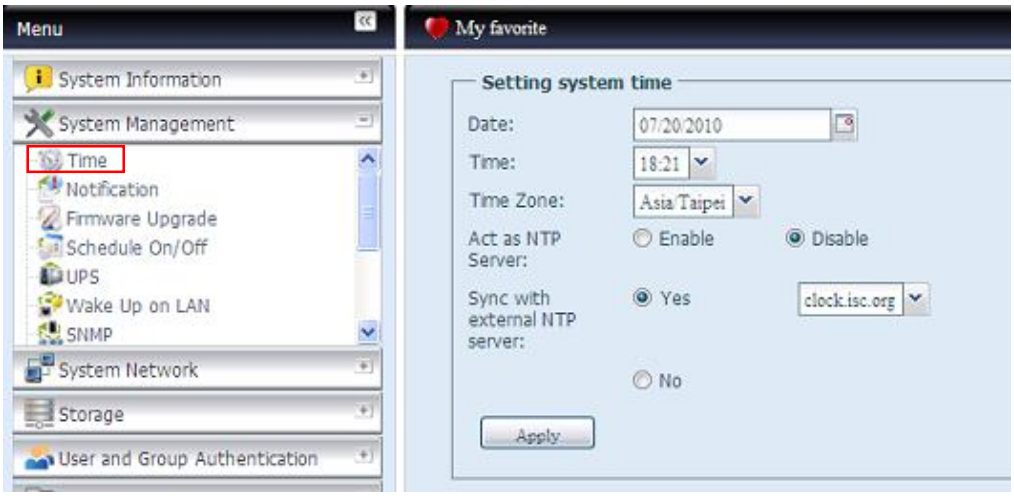

Registration option
Enable
The following information will be recorded after [Enable] checked:
[Product Model Name], [Current FW version], [Mac address of WAN], [Mail address of system notification], [Web UI Language].
There are few more items we like to get it back for statistic and analysis purpose upon to your agreement.
Internal HDD branding and FW version
Time Zone
Apply
List of most recent update
All
Firmware
Module
Publish date
Information Delivery
2009-10-23 20:22:37 You have new firmware 3.01.00.46
2009-10-14 15:13:28 You have new module IP Cam 1.0.62
2009-10-14 15:13:02 You have new module IP Cam 1.0.61
2009-10-14 15:12:40 You have new module IP Cam 1.0.6
2009-10-14 15:12:24 You have new module IP Cam 1.0.59
2009-10-14 15:12:12 You have new module IP Cam 1.0.58
2009-10-14 15:12:02 You have new module IP Cam 1.0.57
2009-10-14 15:11:51 You have new module IP Cam 1.0.56
2009-10-14 15:11:41 You have new module IP Cam 1.0.55
2009-10-14 15:11:30 You have new module IP Cam 1.0.54
2009-10-14 15:11:03 You have new module IP Cam 1.0.53

System Management

The **System Management** menu gives you a wealth of settings that you can use to configure your Thecus IP storage system administration functions. You can set up system time, system notifications, and even upgrade firmware from this menu.

Time: Setting system time

From the **time** menu, choose the **Time** item and the **Time** screen appears. Set the desired **Date**, **Time**, and **Time Zone**. You can also elect to synchronize the system time on Thecus IP storage with an **NTP (Network Time Protocol) Server**.



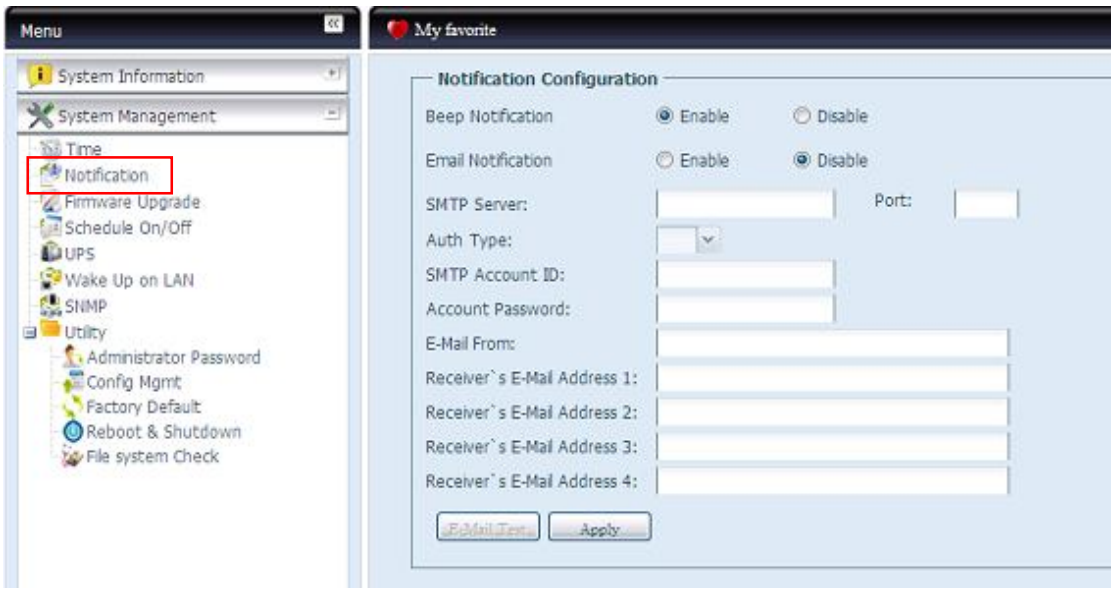
See the following table for a detailed description of each item:

Time	
Item	**Description**
Date	Sets the system date.
Time	Sets the system time.
Time Zone	Sets the system time zone.
Act as NTP Server	Select ***Enable*** to synchronize with the NTP server. Select Disable to close the NTP server synchronization.
Sync with external NTP Server	Select **YES** to allow Thecus IP storage to synchronize with an NTP server of your choice. Press **Apply** to change.

WARNING If an NTP server is selected, please make sure your Thecus IP storage has been setup to access the NTP server.

Notification configuration

From the menu, choose the ***Notification*** item, and the **Notification Configuration** screen appears. This screen lets you have Thecus IP storage notify you in case of any system malfunction. Press ***Apply*** to confirm all settings. See following table for a detailed description of each item.



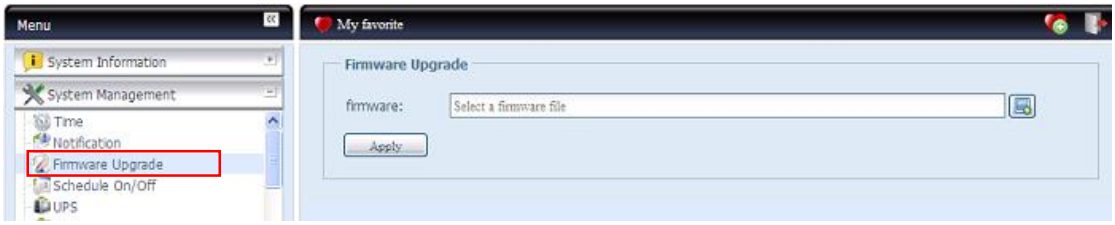
Notification Configuration	
Item	**Description**
Beep Notification	Enable or disable the system beeper that beeps when a problem occurs.
Email Notification	Enable or disable email notifications of system problems.
SMTP Server	Specifies the hostname/IP address of the SMTP server.
Port	Specifies the port to send outgoing notification emails.
Auth Type	Select the SMTP Server account authentication type.
SMTP Account ID	Set the SMTP Server Email account ID.
Account Password	Enter a new password.
E-mail From	Set email address to send email.
Receiver's E-mail Address (1,2,3,4)	Add one or more recipient's email addresses to receive email notifications.

NOTE

Consult with your mail server administrator for email server information.

Firmware Upgrade

From the menu, choose the ***Firmware Upgrade*** item and the **Firmware Upgrade** screen appears.



Follow the steps below to upgrade your firmware:

1. Use the ***Browse*** button to find the firmware file.
2. Press ***Apply***.
3. The beeper beeps and the Busy LED blinks until the upgrade is complete.

NOTE

- The beeper only beeps if it is enabled in the System Notification menu.
- Check Thecus website for the latest firmware release and release notes.
- Downgrading firmware is not permitted.

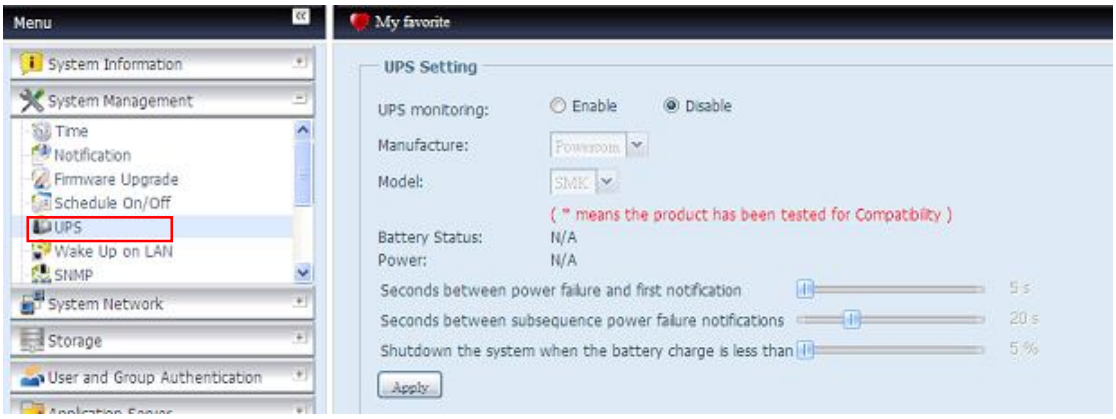
WARNING

Do not turns off the system during the firmware upgrade process.
This will lead to a catastrophic result that may render the system inoperable.

UPS Setting

The Thecus IP storage can also support various uninterruptible power supply unit via either "Serial" or "USB" interface (depend on model) to provide extra data security and accessibility in the case of a power failure.

From the **Status** menu, choose the ***UPS*** item and the **UPS Setting** screen appears. Make any changes you wish, and press ***Apply*** to confirm changes.



See the following table for a detailed description of each item.

UPS Setting	
Item	**Description**
UPS Monitoring	Enable or disable UPS monitoring.
Manufacturer	Choose the UPS manufacturer from the dropdowns.
Model	Choose the UPS model number from the dropdowns.
Battery Status	Current status of the UPS battery
Power	Current status of the power being supplied to the UPS
Seconds between power failure and first notification	Delay between power failure and first notification in seconds.
Seconds between subsequent power failure notifications	Delay between subsequent notifications in seconds.
Shutdown the system when the battery charge is less than	Amount of UPS battery remaining before system should auto-shutdown.
Apply	Press ***Apply*** to save your changes.

Schedule Power On/Off

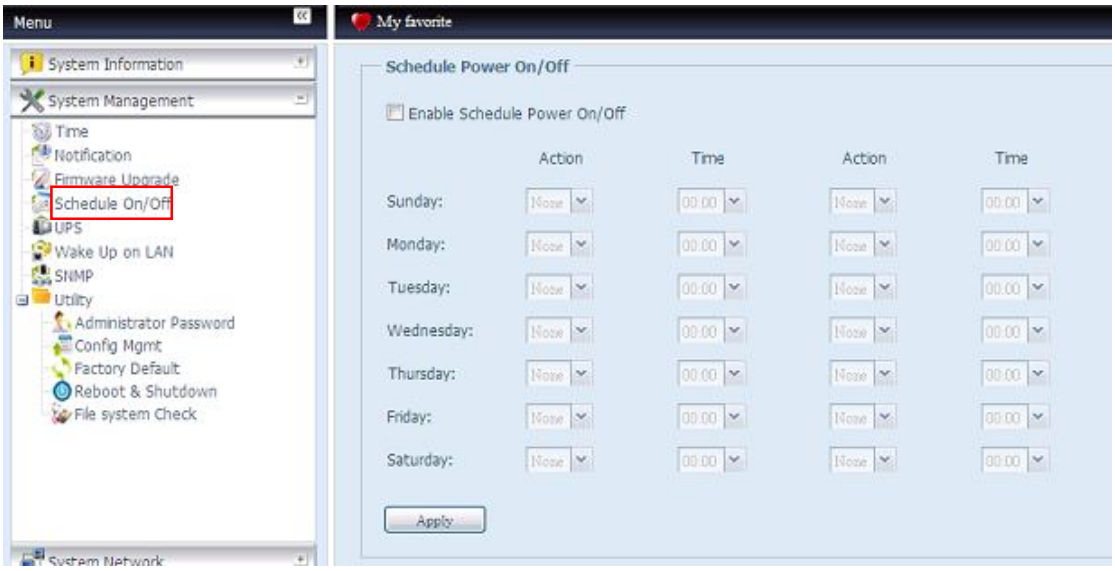
Using the Thecus IP storage System Management, you can save energy and money by scheduling the Thecus IP storage to turn itself on and off during certain times of the day.

From the menu, choose the **Schedule Power On/Off** item and the **Schedule Power On/Off** screen appears.

To designate a schedule for the Thecus IP storage to turn on and off, first enable the feature by checking the **Enable Schedule Power On/Off** checkbox.

Then, simply choose an on and off time for each day of the week that you would like to designate a schedule by using the various dropdowns.

Finally, click ***Apply*** to save your changes.



Example - Monday: On: 8:00; Off: 16:00
System will turn on at 8:00 AM on Monday, and off at 16:00 on Monday. System will turn on for the rest of the week.

If you choose an on time, but do not assign an off time, the system will turn on and remain on until a scheduled off time is reached, or if the unit is shutdown manually.

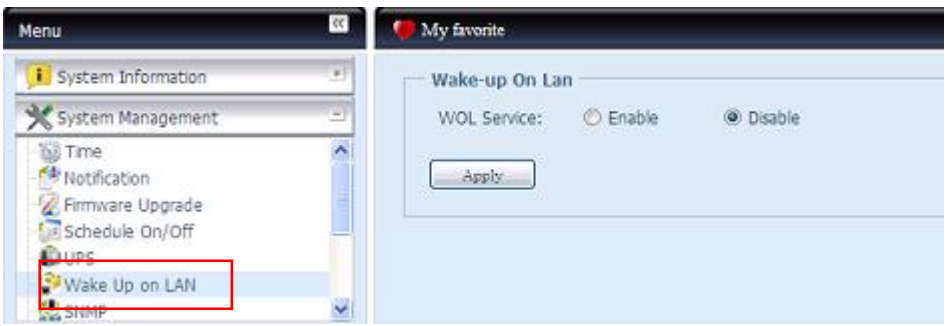
Example - Monday: On: 8:00
System will turn on at 8:00 AM on Monday, and will not shut down unless powered down manually.

You may also choose two on times or two off times on a particular day, and the system will act accordingly.

Example - Monday: Off: 8:00; Off: 16:00
System will turn off at 8:00 AM on Monday. System will turn off at 16:00 PM on Monday, if it was on. If the system was already off at 16:00 PM on Monday, system will stay off.

Wake-Up On LAN (WOL)

The Thecus IP storage has the ability to be awoken from sleep mode via WAN/LAN1 port.

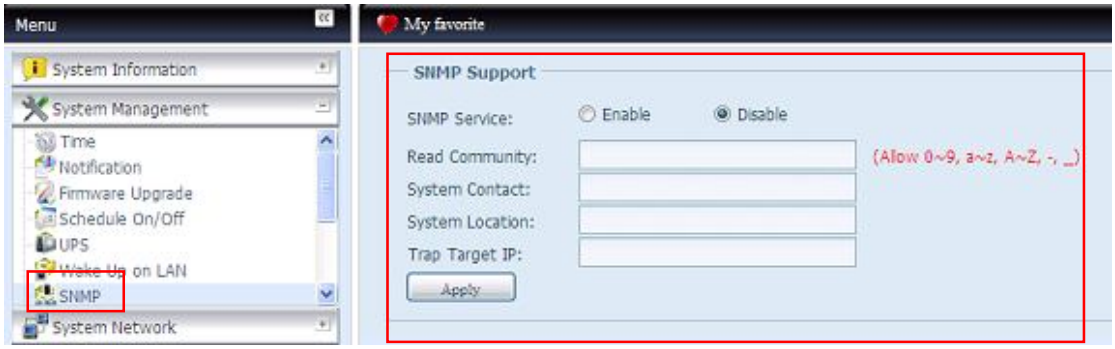


From the menu, choose the ***WOL*** item, and the **Wake-up On LAN** screen appears. From here, you can **Enable** or **Disable**.

Wake-up On LAN Configuration	
Item	**Description**
WOL Service	**Enable** or **Disable** WOL service
Apply	Click ***Apply*** to save changes.

SNMP Support

From the menu, choose the **SNMP** item and the **SNMP Support** screen appears. You could enable the SNMP function and filled in the related information in each fields. With the SNMP management software could get system basic information.



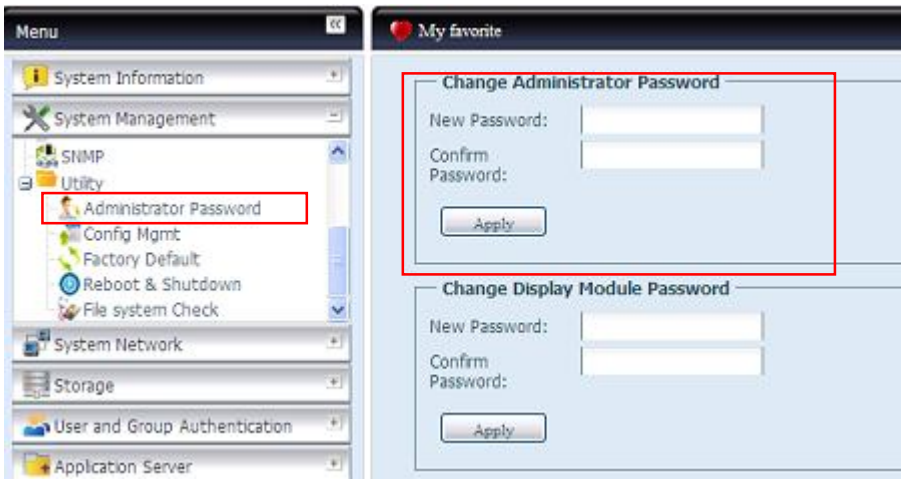
From the menu, choose the **SNMP** item, and the **SNMP Support** screen appears. From here, you can **Enable** or **Disable**.

Utility

- **Administrator password**

From the menu, choose the **Administrator Password** item and the **Change Administrator Password** screen appears. Enter a new password in the **New Password** box and confirm your new password in the **Confirm Password** box. Press ***Apply*** to confirm password changes.

There is also **password** for enter **LCD** setting you could setup here. Enter a new password in the **New Password** box and confirm your new password in the **Confirm Password** box. Press ***Apply*** to confirm password changes.



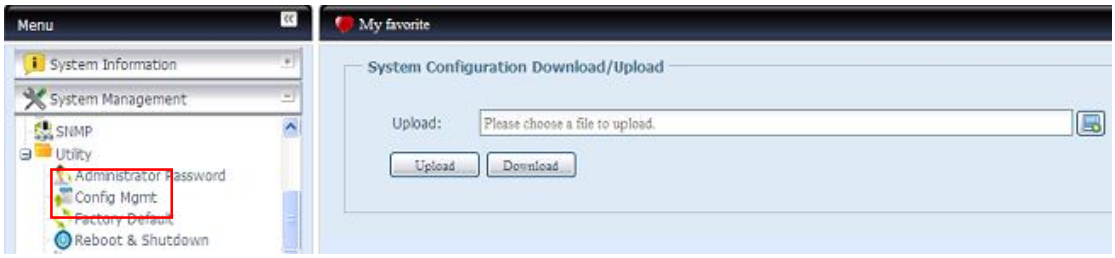
See the following table for a detailed description of each item.

Change Administrator and LCD Entry Password	
Item	**Description**
New Password	Type in a new administrator password.

Confirm Password	Type the new password again to confirm.
Apply	Press this to save your changes.

- **Config Mgmt**

From the menu, choose the ***Config Mgmt*** item and the **System Configuration Download/Upload** screen appears. From here, you can download or upload stored system configurations.



See the following table for a detailed description of each item.

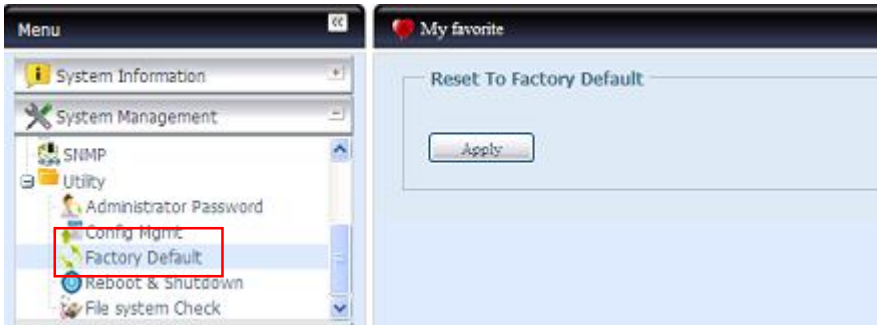
System Configuration Download/Upload	
Item	**Description**
Download	Save and export the current system configuration.
Upload	Import a saved configuration file to overwrite current system configuration.

NOTE

Backing up your system configuration is a great way to ensure that you can revert to a working configuration when you are experimenting with new system settings. The system configuration you have backup can be only restore in same firmware version. And the backup details have excluded user/group accounts.

- **Factory default**

From the menu, choose the ***Factory Default*** item and the **Reset to Factory Default** screen appears. Press ***Apply*** to reset Thecus IP storage to factory default settings.

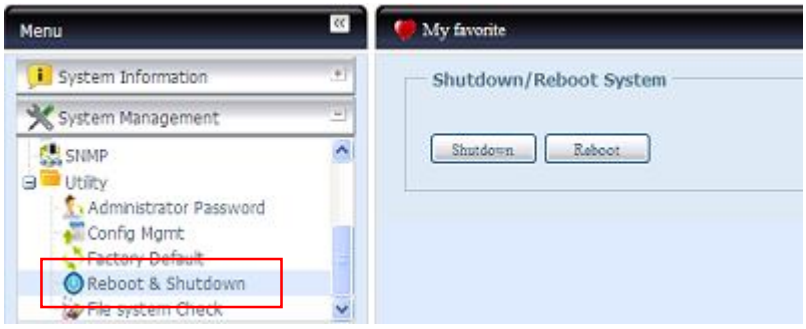


WARNING

Resetting to factory defaults will not erase the data stored in the hard disks, but WILL revert all the settings to the factory default values.

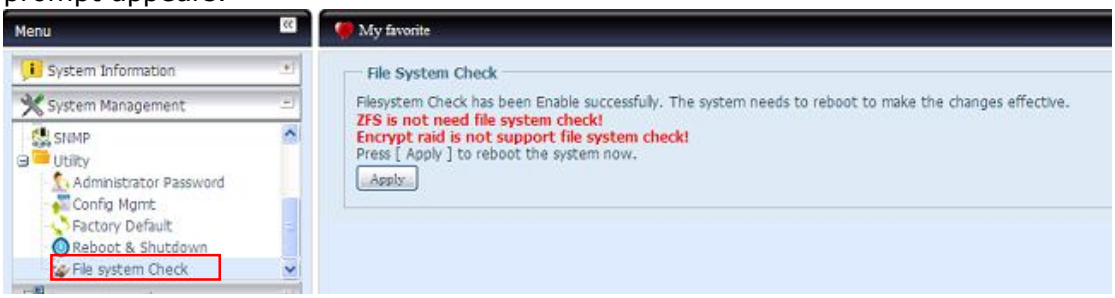
- **Reboot & Shutdown**

From the menu, choose **Reboot & Shutdown** item, and the **Shutdown/Reboot System** screen appears. Press ***Reboot*** to restart the system or ***Shutdown*** to turn the system off.



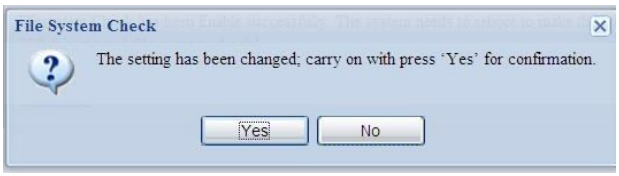
- **File System check**

The File System Check allows you to perform a check on the integrity of your disks' file system. Under the menu, click ***File system Check*** and the **File System Check** prompt appears.

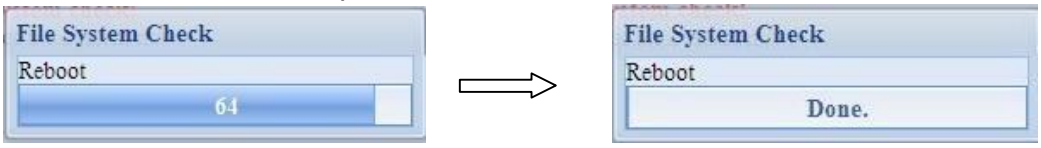


To perform a file system check, click ***Apply***.

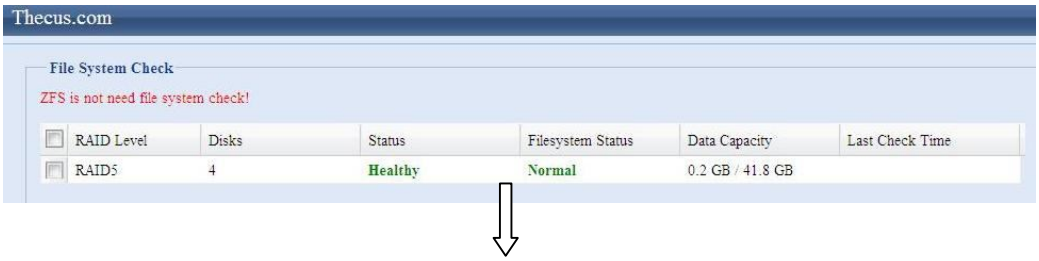
Once clicked, the following prompt will appear:

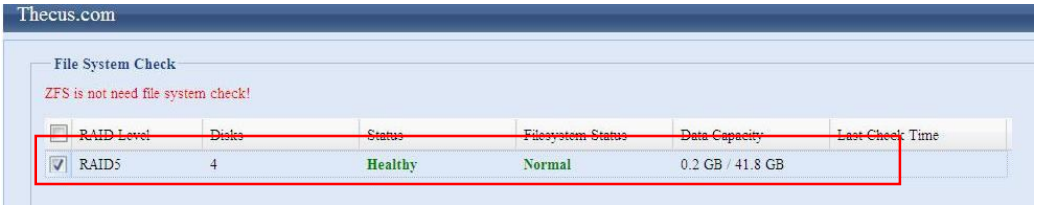


Click ***Yes*** to reboot the system.

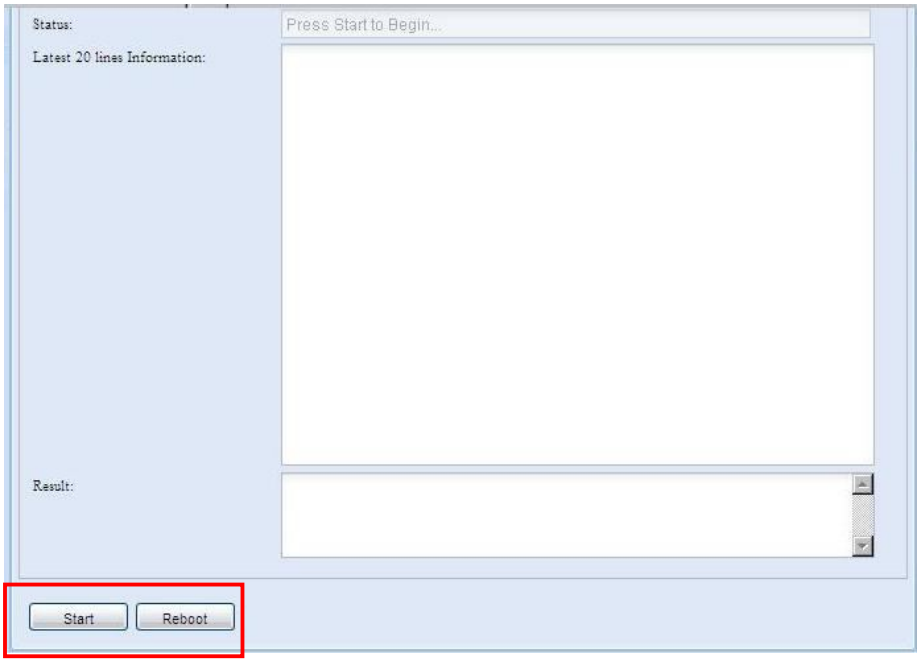


Once the system has rebooted, you will be returned to the **File System Check** prompt. There you will see the available RAID volumes to run the file system check on except ZFS volume, ZFS has no need to perform file system check. Check the desired RAID volumes and click ***Next*** to proceed with the file system check. Click ***Reboot*** to reboot without running the check.

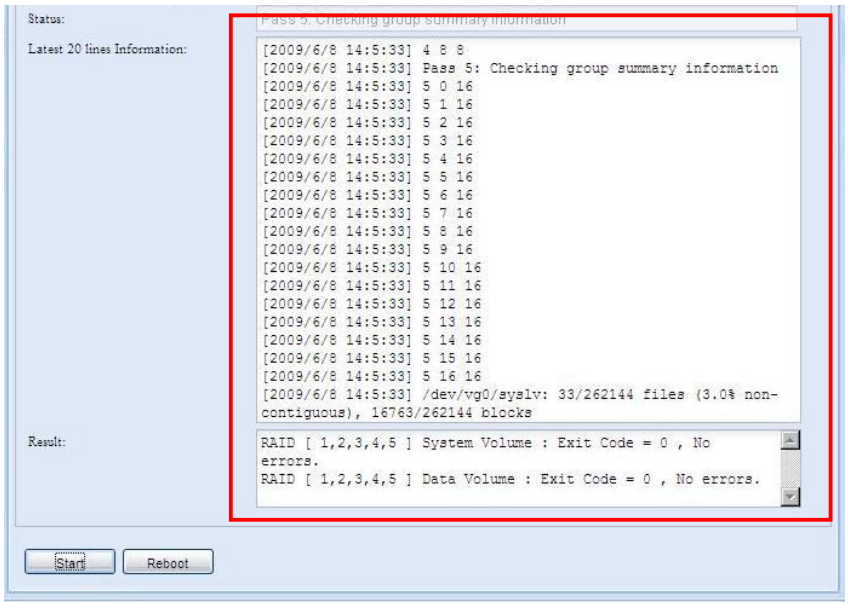




Once you click ***Next***, you will see the following screen:



Click ***Start*** to begin the file system check. Click ***Reboot*** to reboot the system. When the file system check is run, the system will show 20 lines of information until it is complete. Once complete, the results will be shown at the bottom.



NOTE The system must be rebooted before Thecus IP storage can function normally after file system check complete.

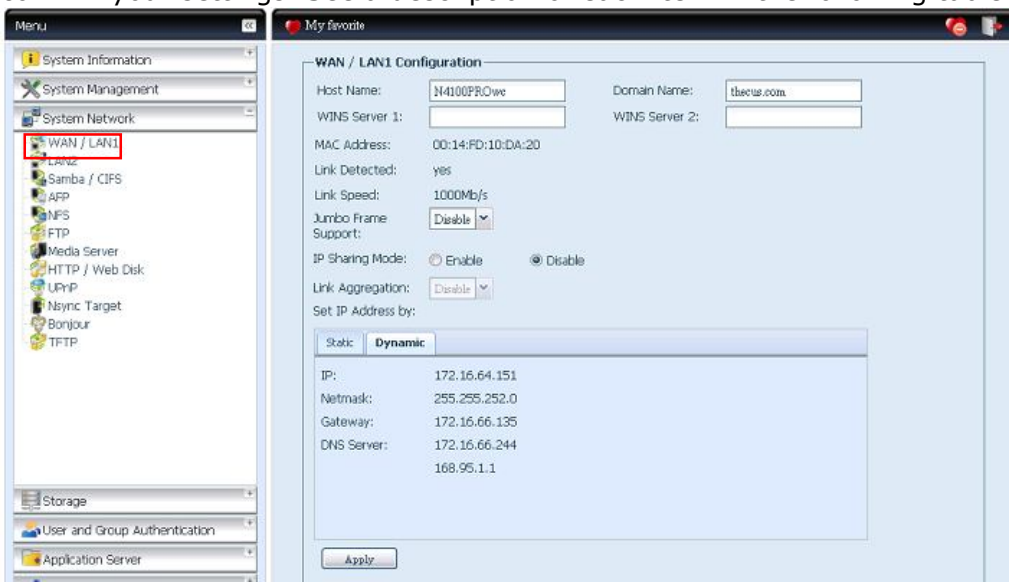
System Network

Use the **System Network** menu to make network configuration settings as well as service support settings.

WAN/LAN1

WAN/LAN1 Configuration

From the **System Network** menu, choose ***WAN/LAN1***, and the **WAN/LAN1 Configuration** screen appears. This screen displays the network parameters of the WAN/LAN1 connection. You may change any of these items and press ***Apply*** to confirm your settings. See a description of each item in the following table:



WAN/LAN1 Configuration	
Item	**Description**
Host name	Host name that identifies the Thecus IP storage on the network.
Domain name	Specifies the domain name of Thecus IP storage.
WINS Server	To set a server name for NetBIOS computer.
MAC Address	MAC address of the network interface.
Jumbo Frame Support	Enable or disable Jumbo Frame Support of the WAN/LAN1 interface on your Thecus IP storage.
IP Sharing Mode	When enabled, PCs connected to the LAN2 port will be able to access the WAN/LAN1.
Link Aggregation	Specifies whether WAN/LAN1 and LAN2 ports will be aggregated and act as one port. There are 6 modes can be choose from: Load Balance/Fail-over/Balance-XOR/802.3ad/Balance-TLB/Balance-ALB
Set IP Address by: Static / Dynamic	You can choose a static IP or Dynamic IP, and input your network configuration
IP	IP address of the WAN/LAN1 interface.
Netmask	Network mask, which is generally: `255.255.255.0`
Gateway	Default Gateway IP address.
DNS Server	Domain Name Service (DNS) server IP address.

NOTE

- Only use Jumbo Frame settings when operating in a Gigabit environment where all other clients have Jumbo Frame Setting enabled.
- Enabling DHCP automatically turns on UPnP— see the Service Support Screen.
- If you are only using the WAN/LAN1 port, we suggest that you disable IP Sharing Mode. This will result in higher throughput.
- A correct DNS setting is vital to networks services, such as SMTP and NTP.
- To use the Link Aggregation with "802.3ad selected" feature, please make sure the networking equipment on the other end of Ethernet cable also supports 802.3ad protocol.

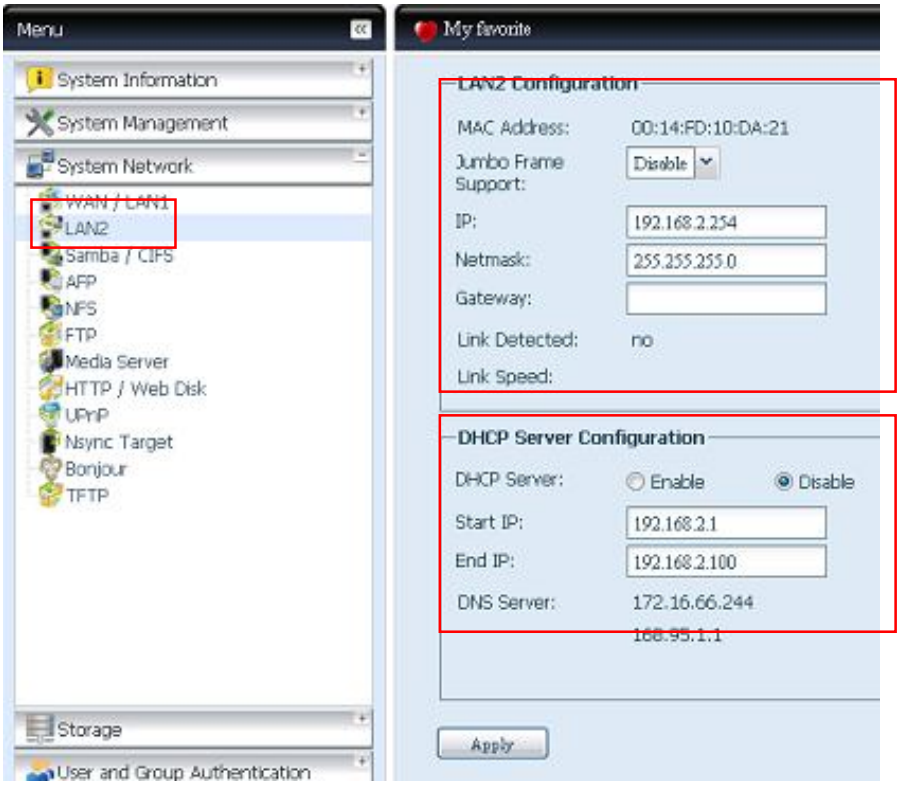
WARNING

Most Fast Ethernet (10/100) Switches/Routers do not support Jumbo Frame and you will not be able to connect to your N8800 after Jumbo Frame is turned on. If this happens, turn off the N8800. Then, insert USB disk with factory reset utility included and power on the N8800. Till the system power on complete then it will bring your system settings back to factory default.

LAN2

LAN2 Configuration

The Thecus IP storage supports two Gigabit Ethernet ports for higher service availability. To configure these ports, choose ***LAN2*** from the **System Network** menu, and the **LAN2 Configuration** screen appears. Press ***Apply*** to save your changes.



LAN2 Configuration	
Item	**Description**
MAC Address	Displays the MAC address of the LAN2 interface.
Jumbo Frame Support	Enable or disable Jumbo Frame Support on the LAN2 interface.
IP	Specifies the IP address of the LAN2 interface.
Netmask	Specifies the Network Mask of the LAN2 interface.
Gateway	When Thecus NAS as a DHCP server from LAN2, it can have another route to balance traffic bandwidth for its DHCP clients
Link Detected	Specifies the LAN2 port link status
Lick Speed	Specifies the LAN2 port link speed

NOTE

Before enabling Jumbo Frame Support, please make sure your network equipment supports Jumbo Frame. If your equipment is incompatible, you might not be able to connect to your Thecus IP storage.

NOTE

If the IP sharing mode setting is set to "Enable" under WAN/LAN21 port, then this 2nd gateway cannot be configured.

DHCP Server Configuration

A DHCP server can be configured to assign IP addresses to devices connected to the LAN2 port. To configure these ports, choose ***LAN2*** from the **System Network** menu.

DHCP Configuration	
Item	**Description**
DHCP Server	Enable or disable the DHCP server to automatically assign IP address to PCs connected to the LAN2 interface.
Start IP	Specifies the starting IP address of the DHCP range.
End IP	Specifies the ending IP address of the DHCP range.
DNS Server	Displayed the DNS server IP address.

NOTE

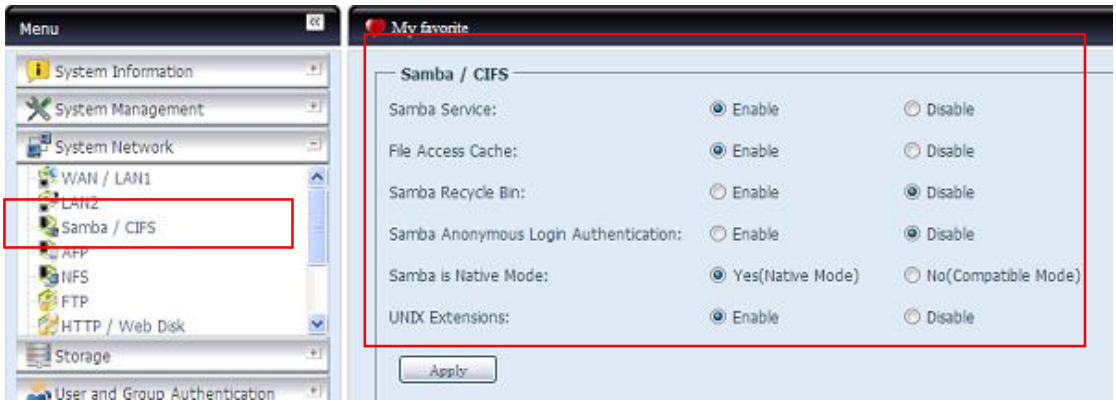
The IP Segment of WAN/LAN1 and LAN2 should not overlap.

WARNING

The IP address of the LAN2 interface should not be in the range of the Start IP address and End IP address.

Samba / CIFS

There are 5 options is currently allow Admin to Enable/Disable to operate Thecus IP storage associated with Samba / CIFS protocol. With the option changed, it will need to reboot system to activate.



Samba Service

Used for letting the operating system of UNIX series and SMB/CIFS of Microsoft Windows operating system (Server Message Block / Common Internet File System).Do the link in network protocol. Enable or Disable SMB/CIFS protocol for Windows, Apple, Unix drive mapping.

NOTE

- In some environments, due to security concerns, you may wish to disable SMB/CIFS as a precaution against computer viruses.

File Access Cache

File Access Cache is default **Enable**. This option will help to increase the performance while single client access share folder in writing under SMB/CIFS protocol.

Samba Recycle Bin

The Thecus IP storage is supported recycle bin via SMB/CIFS protocol. Simply enable it then all of deleted files/folders will reside in the ".recycle" folder with hidden attribution in each share.

In general, Windows has default to invisible all of hidden folders/files. So please enable this option to view ".recycle" folder.

Samba Anonymous Login Authentication

To enable this option, no matter there is share folder has been created in public access. The user account and password is needed from system to access under SMB/CIFS protocol. On the other hand, no more anonymous login is allowed.

Samba is Native mode

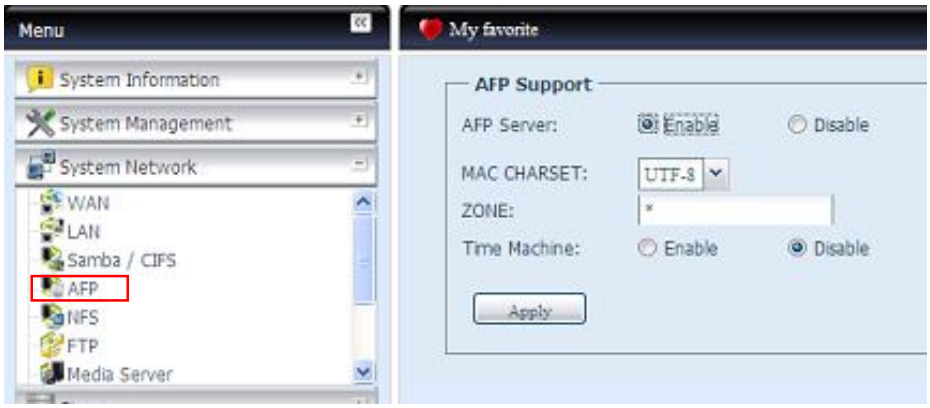
The Thecus IP storage is supported Samba mode options. In the ADS environment with "Native" mode selected then Thecus IP storage is capable to become local master position.

UNIX Extension

The default is enable for Samba usage, with situation using Mac OSX with smb connection may have permission issue. When it happened, please setup "UNIX Extension" disable to get issue solved.

AFP (Apple Network Setup)

From the **System Network** menu, choose the ***AFP*** item, and the **AFP Support** screen appears. This screen displays the configuration items for the Apple Filing Protocol. You can change any of these items and press ***Apply*** to confirm your settings.



A description of each item follows:

Apple Network Configuration	
Item	**Description**
AFP Server	Enable or disable Apple File Service to use Thecus IP storage with MAC OS-based systems.
MAC CHARSET	Specifics the code page from drop down list
Zone	Specifies Zone for Applet Talk service. If your AppleTalk network uses extended networks and is assigned with multiple zones, assign a zone name to Thecus IP storage. If you do not want to assign a network zone, enter an asterisk (*) to use the default setting.
Time Machine	Enable checked box while you like to backup you MAC system to have Thecus IP storage as MAC time machine

NFS Setup

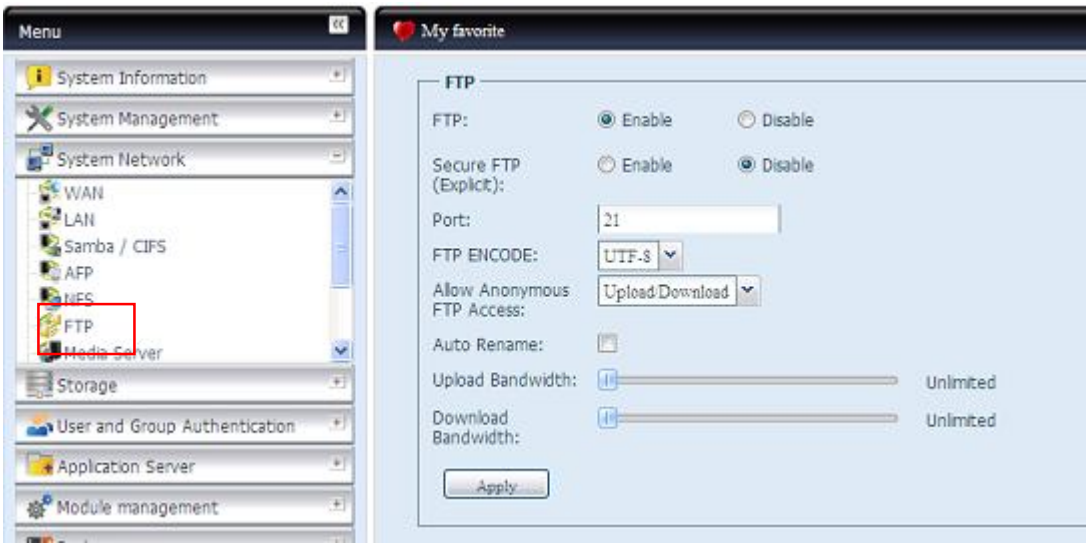
From the **System Network** menu, choose the ***NFS*** item, and the **NFS Support** screen appears. The Thecus IP storage can act as an NFS server, enabling users to download and upload files with the favorite NFS clients. Press ***Apply*** to confirm your settings.

A description of each item follows:

NFS Server Setting	
Item	**Description**
NFS	**Enable** or **Disable** NFS support.
Apply	Click ***Apply*** to save your changes.

FTP

Thecus IP storage can act as a FTP server, enabling users to download and upload files with their favorite FTP programs. From the **System Network** menu, choose the ***FTP*** item, and the **FTP** screen appears. You can change any of these items and press ***Apply*** to confirm your settings.



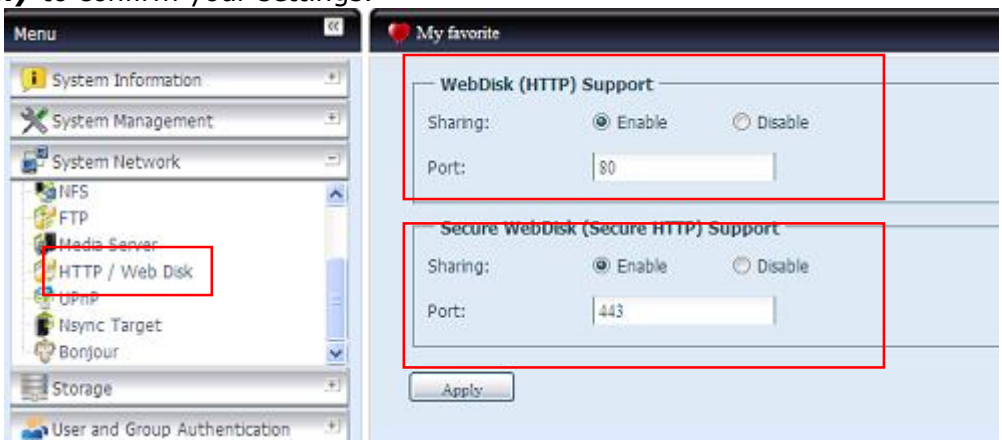
A description of each item follows:

FTP	
Item	**Description**
FTP	Enable FTP Service on Thecus IP storage.
Security FTP	Enable or disable Security FTP, be sure the client FTP software has also security FTP setting enabled.
Port	Specifies the port number of an incoming connection on a non-standard port.
FTP ENCODE	If your FTP client or operating system does not support Unicode (e.g. Windows® 95/98/ME or MAC OS9/8), select the same encoding as your OS here in order to properly view the files and directories on the server. Available options are BIG5, HZ, GB2312, GB18030, ISO, EUC-JP, SHIFT-JIS and UTF-8.
Allow Anonymous FTP Access	**Upload/Download:** Allow anonymous FTP users to upload or download files to/from public folders. **Download:** Allow anonymous FTP users to download files from public folders. **No access:** Block anonymous FTP user access.
Auto Rename	If checked, the system will automatically rename files that are uploaded with a duplicate file name. The renaming scheme is `[filename].#`, where `#` represents an integer.
Upload Bandwidth	You may set the maximum bandwidth allocated to file uploads. Selections include **Unlimited, 1, 2, 4, 8, 16** and **32 MB/s.**
Download Bandwidth	You may set the maximum bandwidth allocated to file downloads. Selections include **Unlimited, 1, 2, 4, 8, 16** and **32 MB/s.**

To access the share folder on Thecus IP storage, use the appropriate user login and password set up on the **Users** page. Access control to each share folder is set up on the **ACL** page (***Storage Management*** > **Shore *Folder*** > ***ACL***).

HTTP/ Web Disk

From the **System Network** menu, choose the **HTTP/ Web Disk** item, and the **Web Disk (HTTP) Support** screen appears. This screen displays the service support parameters of the system. You can change any of these items and press ***Apply*** to confirm your settings.



A description of each item follows:

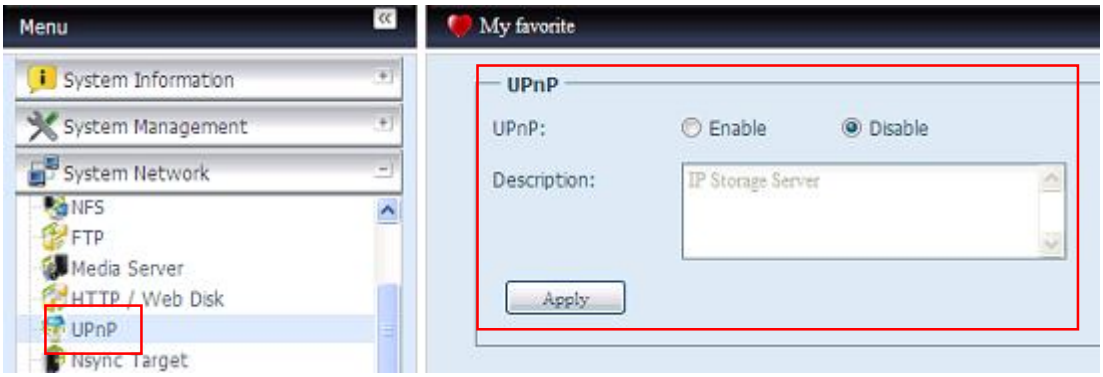
Web Service	
Item	**Description**
HTTP (WebDisk) Support	Enable or disable WebDisk support. Enter the port number if this option is enabled. The port number is default 80.
HTTPs (Secure WebDisk) Support	Enable or disable secure WebDisk support. Enter the port if this option is enabled.

NOTE

- Disable HTTP support and Enable Secure HTTP support to guarantee secure access.

UPnP

This device supports UPnP Media server, which allows users to play media files with UPnP client (ex. DMA devices). Enable or disable Universal Plug and Play protocol. UPnP helps to find the IP address of Thecus IP storage.

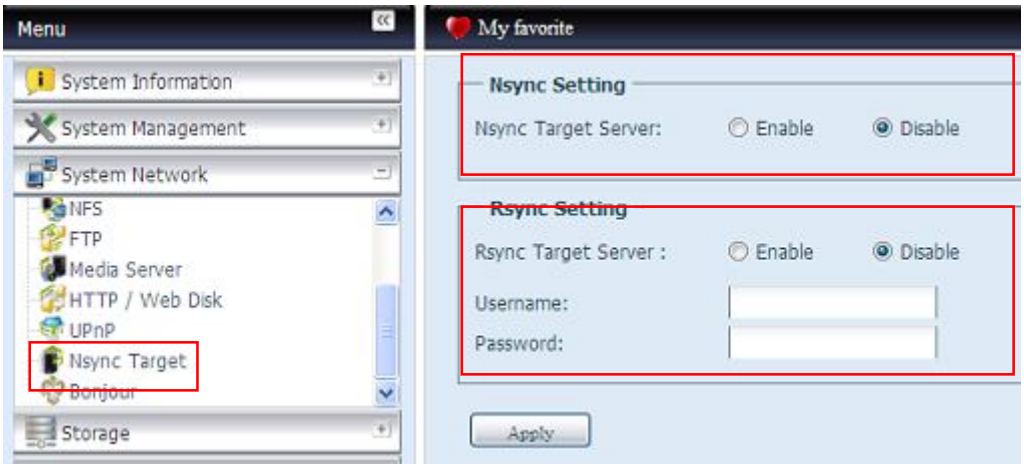


Nsync Target

From the **System Network** menu, choose the **Nsync Target** item, and the **Nsync Setting** screen appears. Enable or Disable your Nsync Target Server. Press ***Apply*** to confirm your settings.

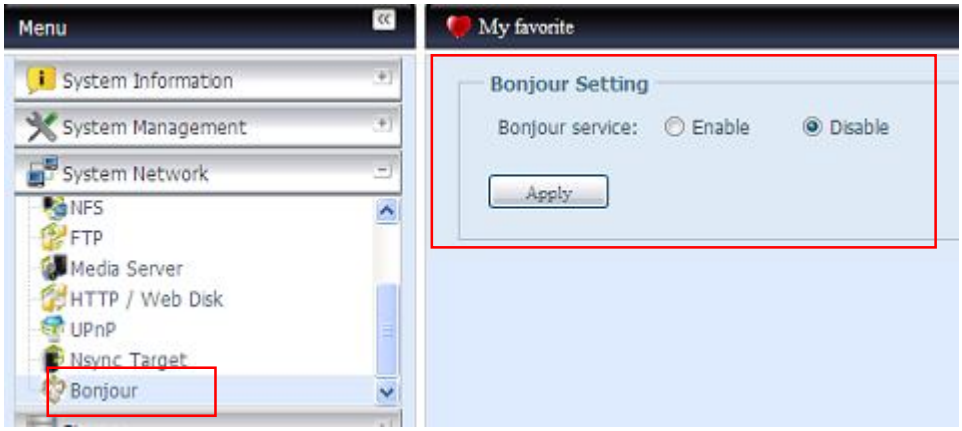
If the Thecus Nsync feature has chose to use Rsync to replicate data between two systems. For the target side to allow source cross data, the Rsync target server needs to assign a username and password for authentication.

Once **Nsync Target** has been enabled, the other Thecus NAS product is able to operate remote replication to this NAS system.



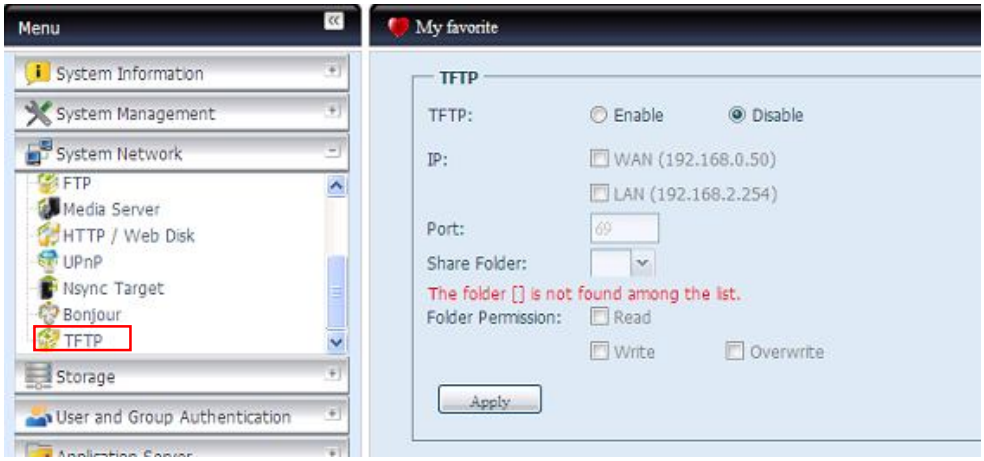
Bonjour Setting

Bonjour, is Apple Inc.'s trade name for its implementation of Zeroconf, a service discovery protocol. Bonjour locates devices such as printers, as well as other computers, and the services that those devices offer on a local network using multicast Domain Name System service records. This definitive guide walks you through Bonjour zero-configuration networking with a complete description of the protocols and technologies used to create Bonjour enabled applications and devices.



TFTP

Thecus IP storage can act as a TFTP server, enabling users to download and upload files with their favorite TFTP programs. From the **System Network** menu, choose the ***TFTP*** item, and the **TFTP** screen appears. You can change any of these items and press ***Apply*** to confirm your settings.



A description of each item follows:

FTP	
Item	**Description**
TFTP	Enable TFTP Service on the Thecus IP storage.
IP	Checked WAN/LAN1 or LAN2 to enable port use
Port	Specifies the port number of an incoming connection on a non-standard port.
Share Folder	Select the file stored folder, it can not be empty.
Folder Permission	Select the folder permission

Storage Management

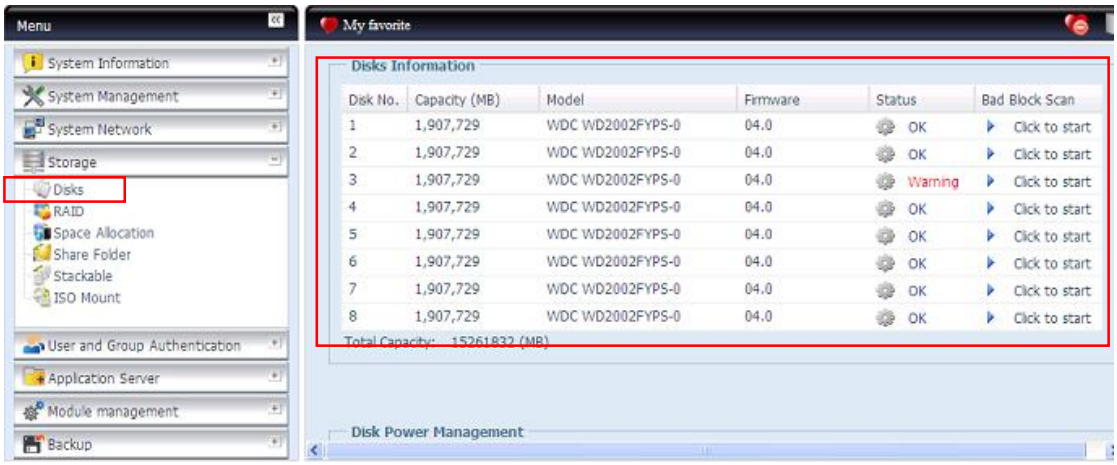
The **Storage** menu displays the status of storage devices installed in the Thecus IP storage, and includes storage configuration options such as RAID and disk settings, folder configuration, space allocation and ISO Mount.

Disks Information

From the **Storage** menu, choose the ***Disks*** item and the **Disks Information** screen appears. From here, you can see various items about installed SATA hard disks. Blank lines indicate that a SATA hard disk is not currently installed in that particular disk slot.

NOTE

- The screen shot below just example from Thecus IP Storage. The disk slots can from 4 to 8 depend on the model of Thecus IP storage.


Menu
System Information
System Management
System Network
Storage
Disks
RAID
Space Allocation
Share Folder
Stackable
ISO Mount
User and Group Authentication
Application Server
Module management
Backup
My favorite
Disks Information
Disk No. | Capacity (MB) | Model | Firmware | Status | Bad Block Scan
1 | 1,907,729 | WDC WD2002FYPS-0 | 04.0 | OK | Click to start
2 | 1,907,729 | WDC WD2002FYPS-0 | 04.0 | OK | Click to start
3 | 1,907,729 | WDC WD2002FYPS-0 | 04.0 | Warning | Click to start
4 | 1,907,729 | WDC WD2002FYPS-0 | 04.0 | OK | Click to start
5 | 1,907,729 | WDC WD2002FYPS-0 | 04.0 | OK | Click to start
6 | 1,907,729 | WDC WD2002FYPS-0 | 04.0 | OK | Click to start
7 | 1,907,729 | WDC WD2002FYPS-0 | 04.0 | OK | Click to start
8 | 1,907,729 | WDC WD2002FYPS-0 | 04.0 | OK | Click to start
Total Capacity: 15261832 (MB)
Disk Power Management

Disks Information	
Item	**Description**
Disk No.	Indicates disk location.
Capacity	Shows the SATA hard disk capacity.
Model	Displays the SATA hard disk model name.
Firmware	Shows the SATA hard disk firmware version.
Status	Indicates the status of the disk. Can read **OK**, **Warning**, or **Failed**.
Bad Block scan	Yes to start scan Bad Block.
Total Capacity	Shows the total SATA hard disk capacity.
Disk Power Management	The administrator can set the disk to power down after a period of inactivity.

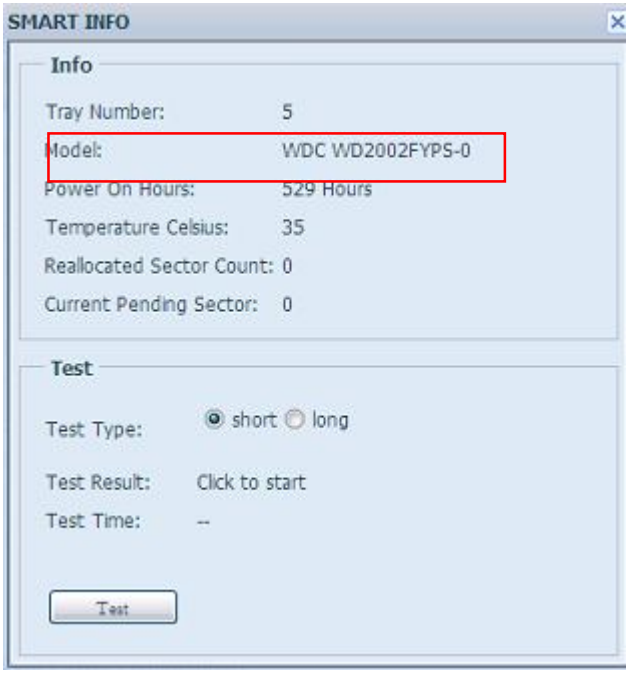
NOTE

When the Status shows Warning, it usually means there are bad sectors on the hard disk. It is shown only as a precaution and you should consider changing the drives.

S.M.A.R.T. Information

On the **Disks Information** screen, the status of each disk will be displayed in the **Status** column. Clicking on an ***OK*** or ***Warning*** link will display the **S.M.A.R.T Information** window for that particular disk.

You may also perform disk SMART test, simply to click "Test" to start with. The result is only for reference and system will not take any action from its result.



S.M.A.R.T. Information	
Item	**Description**
Tray Number	Tray the hard disk is installed in.
Model	Model name of the installed hard disk.
Power ON Hours	Count of hours in power-on state. The raw value of this attribute shows total count of hours (or minutes, or seconds, depending on manufacturer) in power-on state.
Temperature Celsius	The current temperature of the hard disk in degrees Celsius
Reallocated Sector	Count of reallocated sectors. When the hard drive finds a

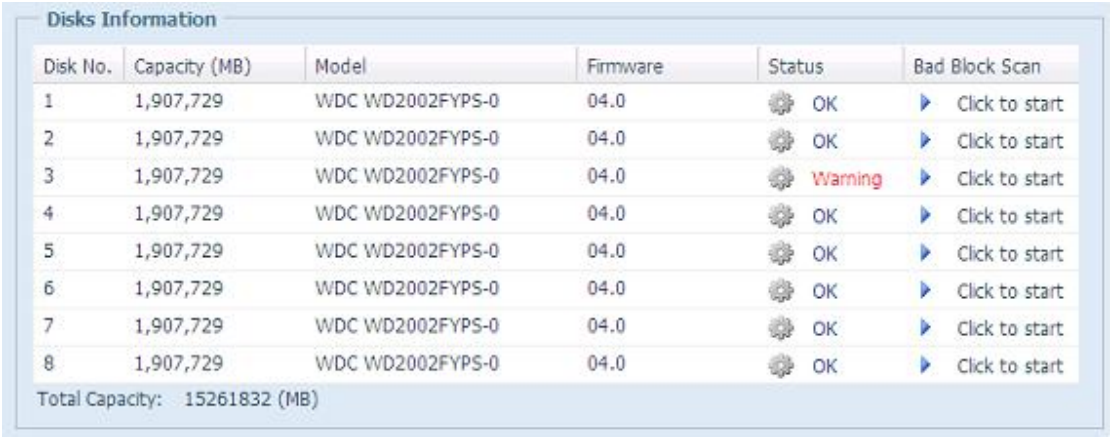
Count	read/write/verification error, it marks this sector as "reallocated" and transfers data to a special reserved area (spare area). This process is also known as remapping and "reallocated" sectors are called remaps. This is why, on a modern hard disks, you can not see "bad blocks" while testing the surface - all bad blocks are hidden in reallocated sectors. However, the more sectors that are reallocated, the more a decrease (up to 10% or more) can be noticed in disk read/write speeds.
Current Pending Sector	Current count of unstable sectors (waiting for remapping). The raw value of this attribute indicates the total number of sectors waiting for remapping. Later, when some of these sectors are read successfully, the value is decreased. If errors still occur when reading sectors, the hard drive will try to restore the data, transfer it to the reserved disk area (spare area), and mark this sector as remapped. If this attribute value remains at zero, it indicates that the quality of the corresponding surface area is low.
Test Type	Set short or long time to test.
Test Result	Result of the test.
Test Time	Total time of the test.

NOTE

If the Reallocated Sector Count > 32 or Current Pending Sector of a hard disk drive > 0 , the status of the disk will show "Warning". This warning is only used to alert the system administrator that there are bad sectors on the disk, and they should replace those disks as soon as possible.

Bad Block Scan

On the **Disks Information** screen, you may also perform disk bad block scan, simply to click "Click to start" to start with. The result is only for reference and system will not take any action from its result.

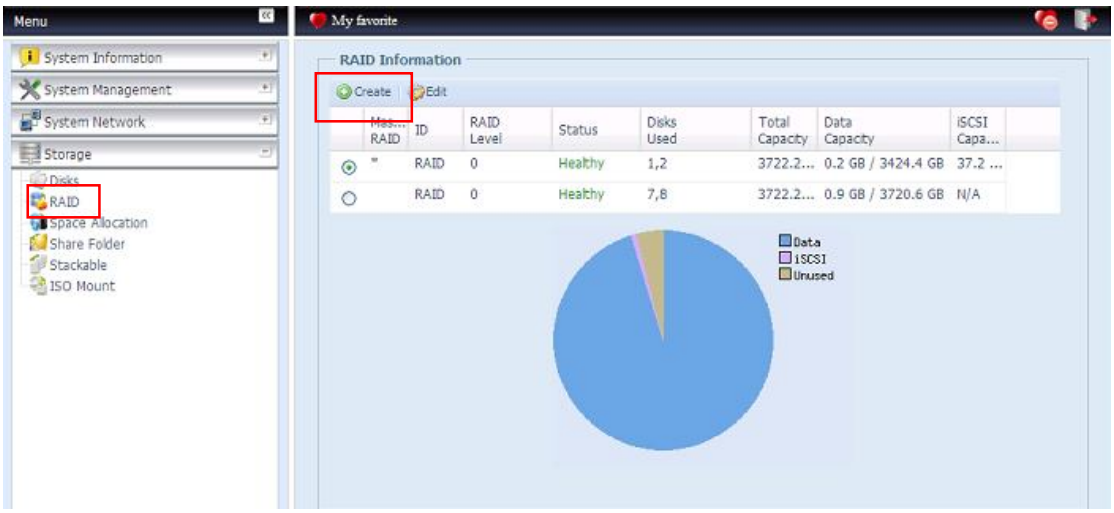

Disks Information
Disk No. Capacity (MB) Model Firmware Status Bad Block Scan
1 1,907,729 WDC WD2002FYPS-0 04.0 OK Click to start
2 1,907,729 WDC WD2002FYPS-0 04.0 OK Click to start
3 1,907,729 WDC WD2002FYPS-0 04.0 Warning Click to start
4 1,907,729 WDC WD2002FYPS-0 04.0 OK Click to start
5 1,907,729 WDC WD2002FYPS-0 04.0 OK Click to start
6 1,907,729 WDC WD2002FYPS-0 04.0 OK Click to start
7 1,907,729 WDC WD2002FYPS-0 04.0 OK Click to start
8 1,907,729 WDC WD2002FYPS-0 04.0 OK Click to start
Total Capacity: 15261832 (MB)

The testing result will be stay till system reboot with "Yet to start" displayed as default.

RAID Information

From the **Storage** menu, choose the ***RAID*** item and the **RAID Information** screen appears.

This screen lists the RAID volumes currently residing on the Thecus IP storage. From this screen, you can get information about the status of your RAID volumes, as well as the capacities allocated for data, and iSCSI. There is also a graph which represents how the RAID volume is currently allocated.



RAID Information	
Item	**Description**
Master RAID	The RAID volume currently designated as the Master RAID volume.
ID	ID of the current RAID volume. **NOTE: All RAID IDs must be unique.**
RAID Level	Shows the current RAID configuration.
Status	Indicates status of the RAID. Can read either ***Healthy***, ***Degraded***, or ***Damaged***.
Disks Used	Hard disks used to form the current RAID volume.
Total Capacity	Total capacity of the current RAID.
Data Capacity	Indicates the used capacity and total capacity used by user data.
iSCSI Capacity	Indicates the capacity allocated to iSCSI.

Create a RAID

On the **RAID Information** screen, press the ***create*** button to go to the **CREAT RAID** screen. In addition to RAID disk information and status, this screen lets you make RAID configuration settings.
Using **Create RAID**, you can select stripe size, choose which disks are RAID disks or the Spare Disk. .

RAID Configurations	
Item	**Description**
Disk No.	Number assigned to the installed hard disks.
Capacity (MB)	Capacity of the installed hard disks.
Model	Model number of the installed hard disks.
Status	Status of the installed hard disks.
Used	If this is checked, current hard disk is a part of a RAID volume.
Spare	If this is checked, current hard disk is designated as a spare for a RAID volume.
Master RAID	Check a box to designate this as the Master RAID volume. See the **NOTE** below for more information.
Stripe Size	This sets the stripe size to maximize performance of sequential files in a storage volume. Keep the 64K setting unless you require a special file storage layout in the storage volume. A larger stripe size is better for large files.
Data Percentage	The percentage of the RAID volume that will be used to store data.
Create	Press this button to configure a file system and create the RAID storage volume.

To create a RAID volume, follow the steps below:

1. On the **RAID Information** screen, click ***create***.

2. On the **RAID Configuration** screen, set the RAID storage space as **JBOD**, **RAID 0**, **RAID 1**, **RAID 5**, **RAID 6**, or **RAID 10** — see **Appendix B: RAID Basics** for a detailed description of each.

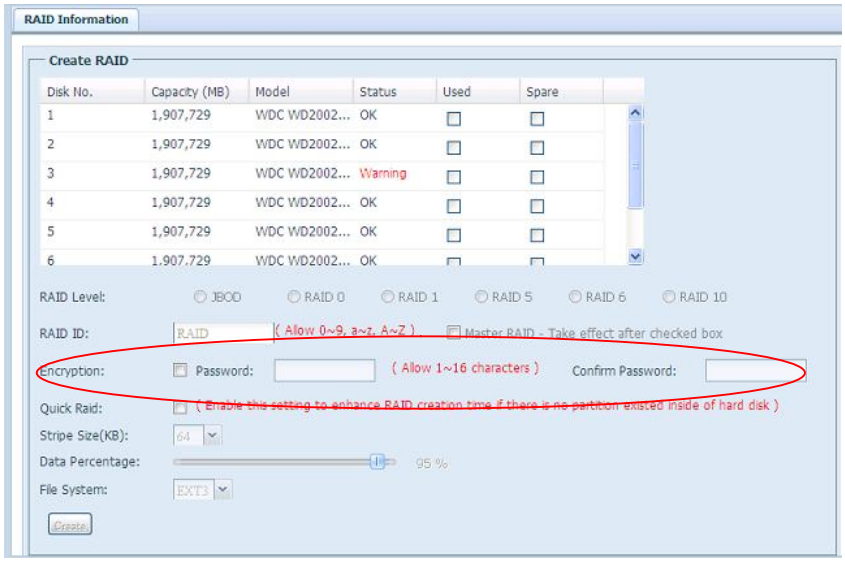
3. Specify a RAID ID.

4. If this RAID volume is meant to be the Master RAID volume, tick the **Master RAID** checkbox.

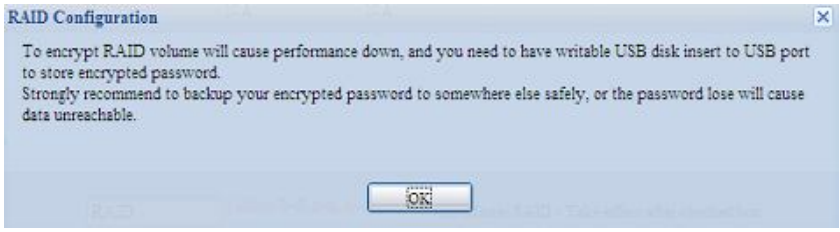
NOTE

In a multiple RAID configuration, one RAID volume must be designated as the Master RAID volume. The Master RAID volume will store all installed modules. If the Master RAID is changed to another location (i.e. assigning volume 2 to be the Master RAID volume after volume 1 had been previously assigned), then all modules must be reinstalled. In addition, all system folders that were contained on the Master RAID volume will be invisible. Reassigning this volume to be the Master RAID will make these folders visible again.

5. Selected whether the RAID volume will be encrypted or not.
   The RAID volume can protect data by using RAID Volume Encryption function to prevent the risk of data exposure. To activate this function, the **Encryption** option needs to be enabled while the RAID is created and followed by password input for identification. Also, an external writable USB disk plugged into any USB port on the system is required to save the password you have entered while the RAID volume is being created. See the screenshot below for details.



Once the **Create** button has been pressed with the **Encryption** checkbox enabled, the following message pop-up will appear for confirmation.


RAID Configuration
To encrypt RAID volume will cause performance down, and you need to have writable USB disk insert to USB port to store encrypted password.
Strongly recommend to backup your encrypted password to somewhere else safely, or the password lose will cause data unreachable.
OK

After the RAID volume has been created, you may remove this USB disk until the next time the system boots. The RAID volume can not be mounted if the USB disk with key can not be found in any system USB port when the volume is accessed. To activate the encrypted volume, plug the USB disk containing the encryption key and into any system USB port.

We are strongly recommended copying the RAID volume encryption key to a safe place. You can find the encryption key file from the USB disk in the following format:

(RAID volume created date)_xxxxxx.key

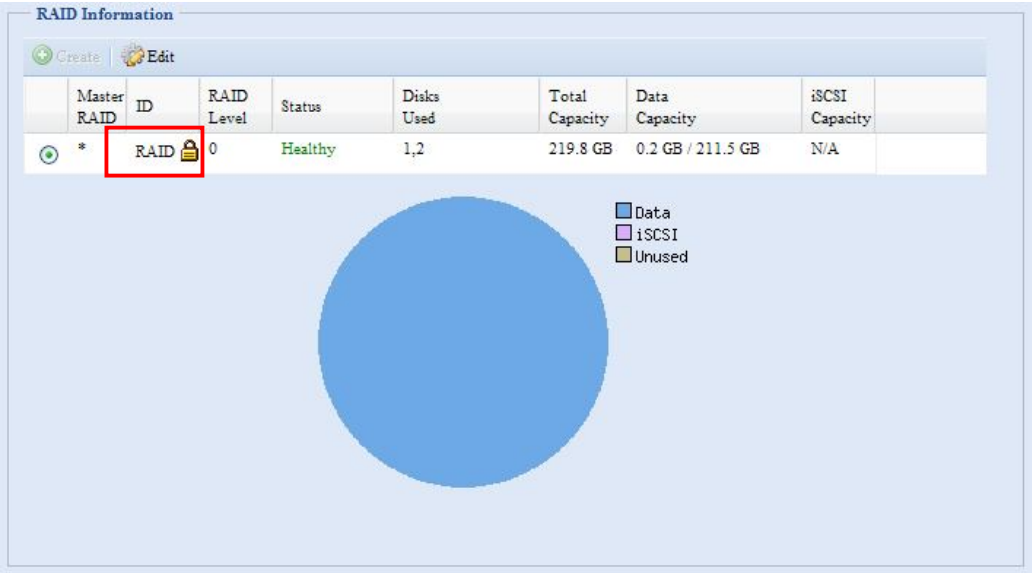
WARNING

Please keep USB disk in a safe place and also backup the encrypted key.
There is no way to rescue data back if the key is lost.

NOTE

1. With RAID volume encryption enabled, the system performance will goes down.
2. With RAID volume encryption enabled, RAID volume expansion will operated in off line mode.

RAID volumes with encryption enabled will be displayed with a key lock symbol next to volume ID name.



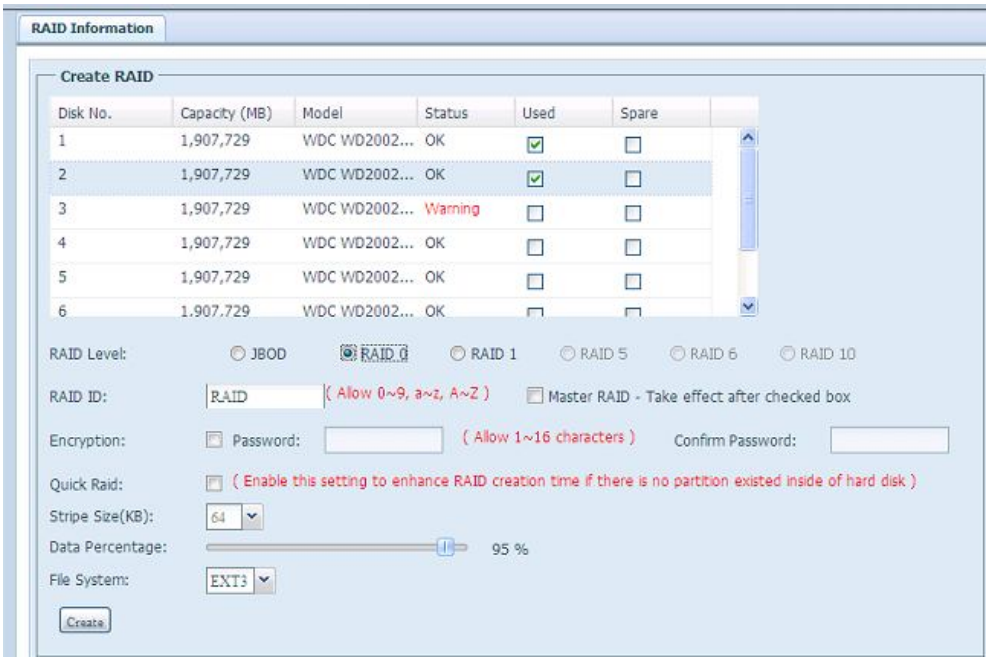
6. Specify a stripe size — 64K is the default setting.

7. Specify the percentage allocated for user data by drag the horizontal bar. The remaining space will be made available for iSCSI.

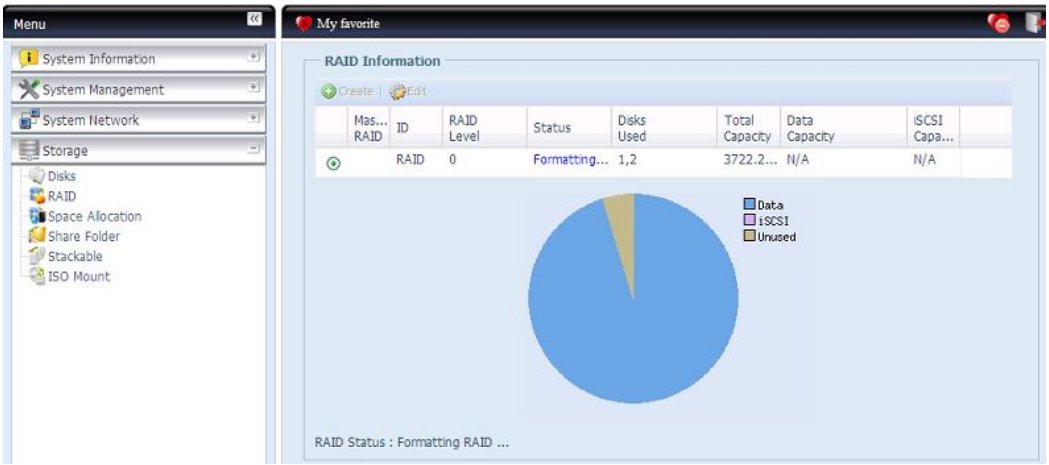
8. Selected the file system you like to have for this RAID volume. The selection is available from ext3, XFS and ZFS.

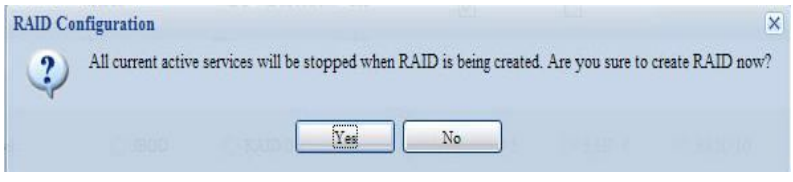
NOTE

- Select ZFS file system while snapshot is needed. It is only one ZFS file system allowed to be created per system.
- ZFS file system is only accessible by CIFS/SMB, not for AFP and NFS users.
- XFS file system is not support folder quota feature


RAID Information
Create RAID
Disk No.
Capacity (MB)
Model
Status
Used
Spare
1 1,907,729 WDC WD2002... OK
2 1,907,729 WDC WD2002... OK
3 1,907,729 WDC WD2002... Warning
4 1,907,729 WDC WD2002... OK
5 1,907,729 WDC WD2002... OK
6 1,907,729 WDC WD2002... OK
RAID Level: JBOD RAID 0 RAID 1 RAID 5 RAID 6 RAID 10
RAID ID: RAID (Allow 0~9, a~z, A~Z) Master RAID - Take effect after checked box
Encryption: Password: (Allow 1~16 characters) Confirm Password:
Quick Raid: (Enable this setting to enhance RAID creation time if there is no partition existed inside of hard disk)
Stripe Size(KB): 64
Data Percentage: 95 %
File System: EXT3
Create

9. Press ***Create*** to build the RAID storage volume.




RAID Configuration
All current active services will be stopped when RAID is being created. Are you sure to create RAID now?
Yes
No

RAID Configuration
RAID Setting Successfully!
All current active services will be stopped when RAID is being created
OK

NOTE

Building a RAID volume may take time, depending on the size of hard drives and RAID mode. In general, while the RAID volume building process is up to "RAID Building" then the data volume is capable to be accessed.

WARNING

Creating RAID destroys all data in the current RAID volume. The data is unrecoverable.

With a RAID 1, RAID 5, RAID 6, or RAID 10 volume, you can also add a spare disk after the RAID is created.
See **Chapter 6: Tips and Tricks > Adding a Spare Disk** for details.
For more information on RAID, see **Appendix B: RAID Basics**.

RAID Level

You can set the storage volume as **JBOD**, **RAID 0**, **RAID 1**, **RAID 5, RAID 6 or RAID 10**. RAID configuration is usually required only when you first set up the device. A brief description of each RAID setting follows:

RAID Levels	
Level	**Description**
JBOD	The storage volume is a single HDD with no RAID support. JBOD requires a minimum of 1 disk.
RAID 0	Provides data striping but no redundancy. Improves performance but not data safety. RAID 0 requires a minimum of 2 disks.
RAID 1	Offers disk mirroring. Provides twice the read rate of single disks, but same write rate. RAID 1 requires a minimum of 2 disks.
RAID 5	Data striping and stripe error correction information provided. RAID 5 requires a minimum of 3 disks. RAID 5 can sustain one failed disk.
RAID 6	Two independent parity computations must be used in order to provide protection against double disk failure. Two different algorithms are employed to achieve this purpose. RAID 6 requires a minimum of 4 disks. RAID 6 can sustain two failed disks.
RAID 10	RAID 10 has high reliability and high performance. RAID 10 is implemented as a striped array whose segments are RAID 1 arrays. It has the fault tolerance of RAID 1 and the performance of RAID 0. RAID 10 requires 4 disks. RAID 10 can sustain two failed disks.

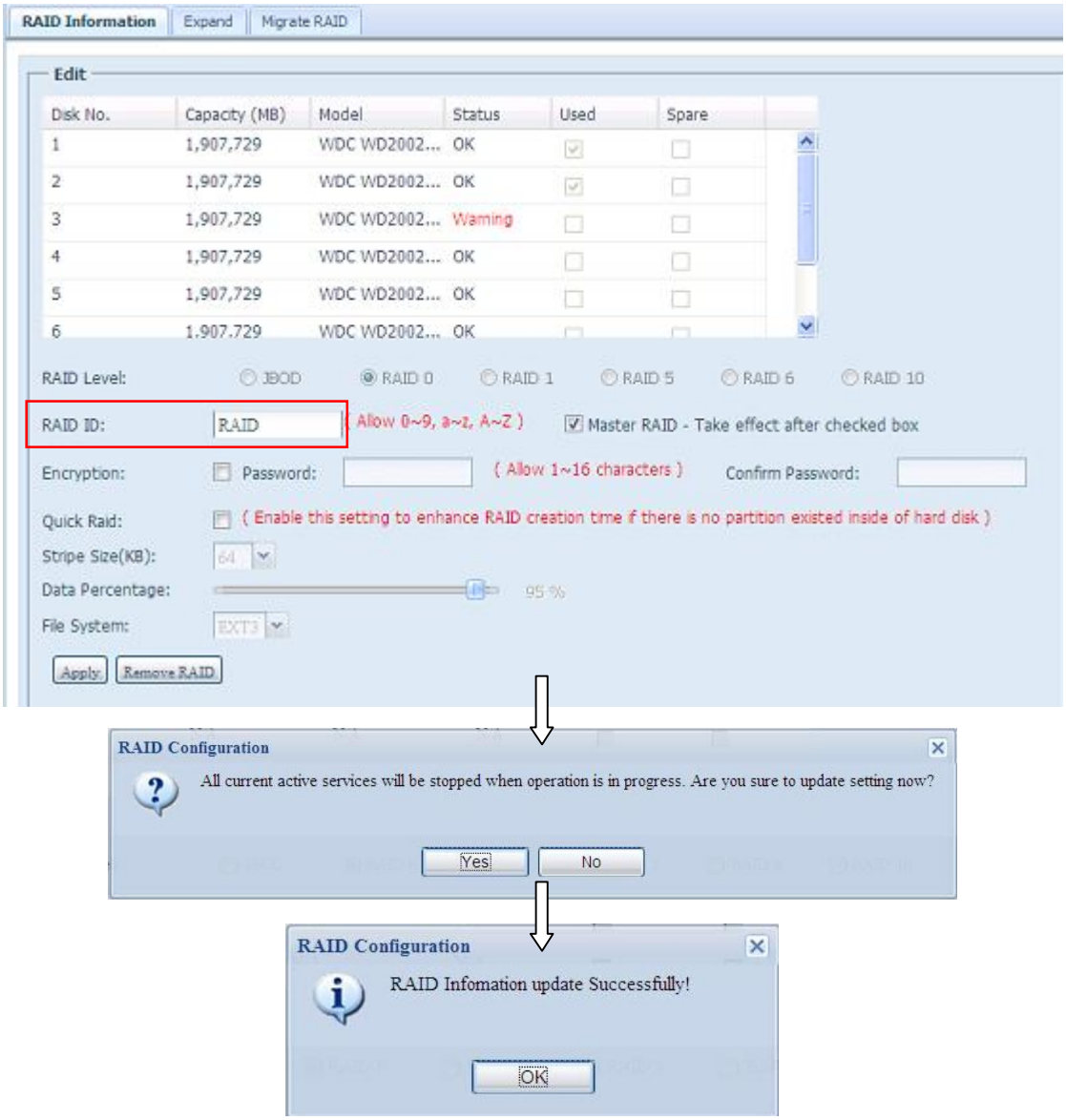
WARNING

If the administrator improperly removes a hard disk that should not be removed when RAID status is degraded, all data will be lost.

Edit RAID

On the **RAID Information** screen, press the ***Edit*** button to go to the **RAID Information** screen.

Using **Edit RAID**, you can select RAID ID and the Spare Disk. .



RAID Configuration
All current active services will be stopped when operation is in progress. Are you sure to update setting now?
Yes
No

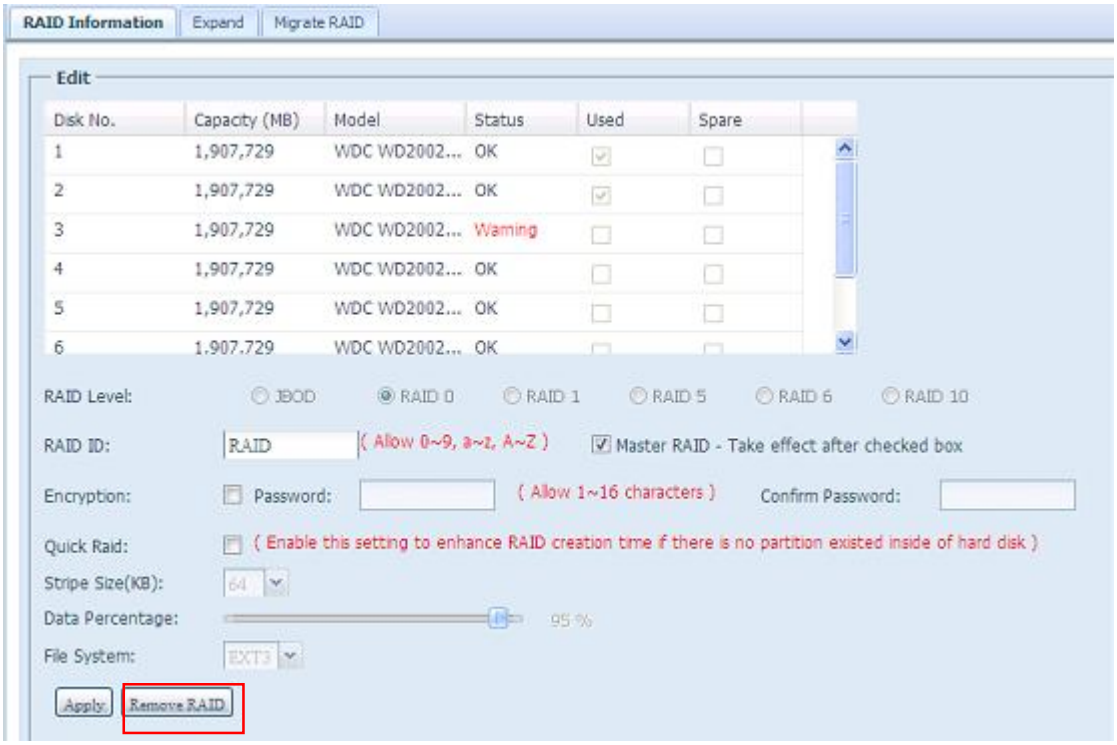
Remove RAID

Click to remove the RAID volume. All user data and iSCSI has been created in selected RAID volume will be removed.
To remove a RAID volume, follow the steps below:

1. On the RAID List screen, select the RAID volume by clicking on its radio button, and click ***RAID Information*** to open the **RAID Configuration** screen.

2. On the **RAID Configuration** screen, click ***Remove RAID***.

3. The confirmation screen appear, you will have to input "Yes" with exactly wording case to complete "**Remove RAID**" operation



WARNING Remove RAID destroys all data in the current RAID volume. The data is unrecoverable.

Expanding a RAID

To expand a RAID 1, RAID 5, RAID 6, or RAID 10 volume, follow the steps below:

1. Replace one of the hard drives in the RAID volume and allow it to automatically rebuild.

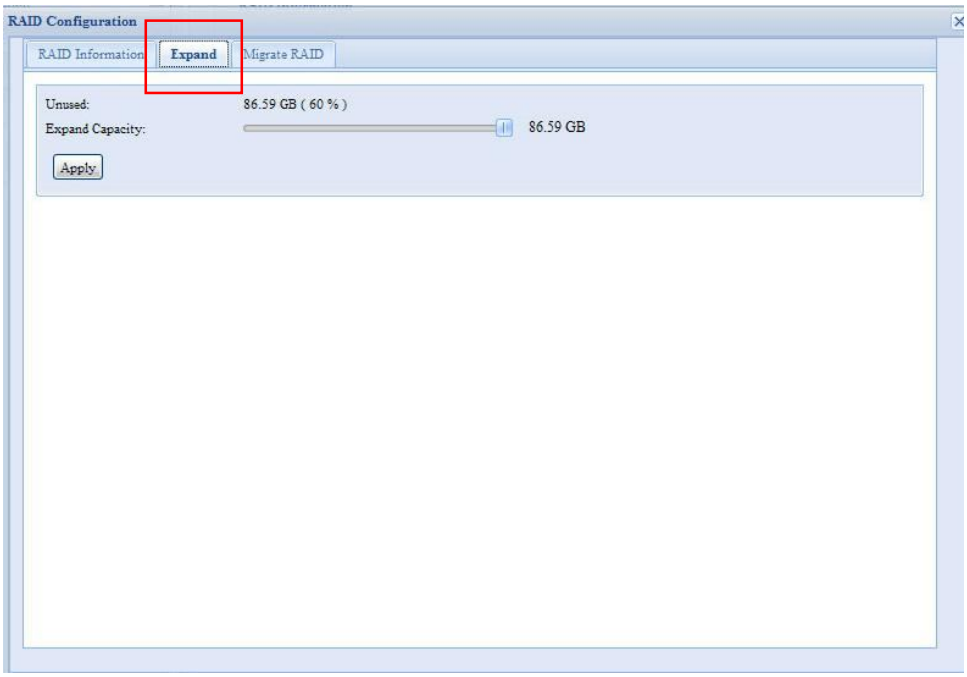
2. Once rebuilt, you can continue to replace any remaining disks in the RAID array.

3. When you are done replacing hard drives, log on to Web Management. Navigate to **Storage**> ***RAID*** to open the **RAID Configuration** screen.

4. On the **RAID Information** screen, and click ***Edit*** to open the **RAID Configuration** screen.

5. On the **RAID Configuration** screen, click ***Expand***.

NOTE RAID expansion did not support file system created by ZFS.



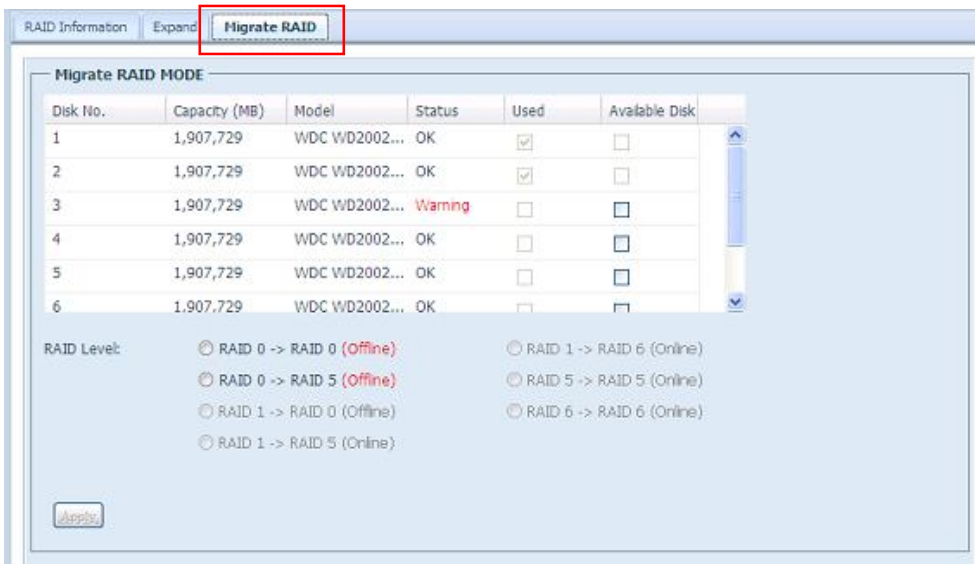
Migrating a RAID

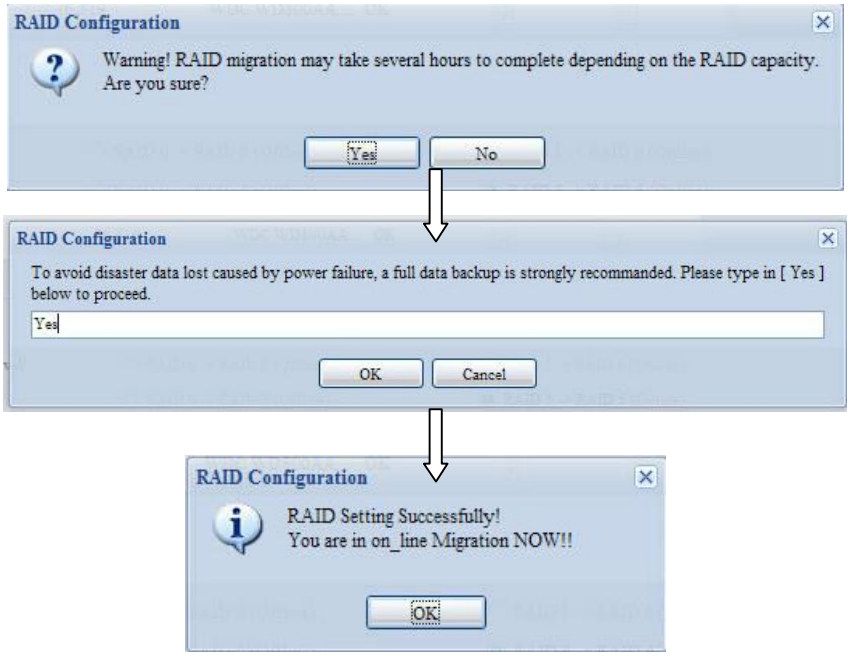
Once a RAID volume has been created, you may want to move it to other physical drives or change the RAID array all together. To migrate a RAID 0, RAID 1, RAID 5 or RAID 6 volume, follow the steps below:

1. From the RAID Configuration screen, click **Migrate RAID.**

2. A list of possible RAID migration configurations will be listed. Select the desired migration scheme and click **Apply**.

3. The system will begin migrating the RAID volume.




RAID Configuration
Warning! RAID migration may take several hours to complete depending on the RAID capacity.
Are you sure?
Yes
No
RAID Configuration
To avoid disaster data lost caused by power failure, a full data backup is strongly recommanded. Please type in [Yes] below to proceed.
Yes
OK
Cancel
RAID Configuration
RAID Setting Successfully!
You are in on_line Migration NOW!!
OK

NOTE Migrating a RAID volume could take several hours to complete

With RAID level migration function, it has two different type "On line" and "Off line" alone with limitation as listed below.

1. During RAID level migration, it is not allowed reboot or shutdown system.
2. Off line RAID level migration, all services will stop and data is inaccessible.
3. To have ZFS file system created doing on line RAID level migration from **R1 to R5 or R1 to R6**, the all services will restart and volumes "user data" and "iSCSI" are read only during operation.
4. To have ext3 and XFS file system created doing on line RAID level migration from **R1 to R5 or R1 to R6**, the all services will restart and volumes "iSCSI" is read only but "user data" is capable read / write during operation.

5. The other combination to make as "On line" can have read / write work as normal.

NOTE

The migration scheme below is based on Thecus Thecus IP Storage series products in maximum possible combination. The other model which has less HDD supported can refer web UI while RAID migration operated.

Below is a table listing of possible RAID migration schemes:

To From	RAID 0	RAID 5	RAID 6
RAID 0	[OFFLINE] [RAID 0] HDDx2 to [RAID 0] HDDx3 [RAID 0] HDDx2 to [RAID 0] HDDx4 [RAID 0] HDDx2 to [RAID 0] HDDx5 [RAID 0] HDDx2 to [RAID 0] HDDx6 [RAID 0] HDDx2 to [RAID 0] HDDx7 [RAID 0] HDDx3 to [RAID 0] HDDx4 [RAID 0] HDDx3 to [RAID 0] HDDx5 [RAID 0] HDDx3 to [RAID 0] HDDx6 [RAID 0] HDDx3 to [RAID 0] HDDx7 [RAID 0] HDDx3 to [RAID 0] HDDx8 [RAID 0] HDDx4 to [RAID 0] HDDx5 [RAID 0] HDDx4 to [RAID 0] HDDx6 [RAID 0] HDDx4 to [RAID 0] HDDx7 [RAID 0] HDDx4 to [RAID 0] HDDx8 [RAID 0] HDDx5 to [RAID 0] HDDx6 [RAID 0] HDDx5 to [RAID 0] HDDx7 [RAID 0] HDDx5 to [RAID 0] HDDx8 [RAID 0] HDDx6 to [RAID 0] HDDx7 [RAID 0] HDDx6 to [RAID 0] HDDx8 [RAID 0] HDDx7 to [RAID 0] HDDx8	[OFFLINE] [RAID 0] HDDx2 to [RAID 5] HDDx3 [RAID 0] HDDx2 to [RAID 5] HDDx4 [RAID 0] HDDx2 to [RAID 5] HDDx5 [RAID 0] HDDx2 to [RAID 5] HDDx6 [RAID 0] HDDx2 to [RAID 5] HDDx7 [RAID 0] HDDx3 to [RAID 5] HDDx4 [RAID 0] HDDx3 to [RAID 5] HDDx5 [RAID 0] HDDx3 to [RAID 5] HDDx6 [RAID 0] HDDx3 to [RAID 5] HDDx7 [RAID 0] HDDx3 to [RAID 5] HDDx8 [RAID 0] HDDx4 to [RAID 5] HDDx5 [RAID 0] HDDx4 to [RAID 5] HDDx6 [RAID 0] HDDx4 to [RAID 5] HDDx7 [RAID 0] HDDx4 to [RAID 5] HDDx8 [RAID 0] HDDx5 to [RAID 5] HDDx6 [RAID 0] HDDx5 to [RAID 5] HDDx7 [RAID 0] HDDx5 to [RAID 5] HDDx8 [RAID 0] HDDx6 to [RAID 5] HDDx7 [RAID 0] HDDx6 to [RAID 5] HDDx8 [RAID 0] HDDx7 to [RAID 5] HDDx8	X
RAID 1	[OFFLINE] [RAID 1] HDDx2 to [RAID 0] HDDx2 [RAID 1] HDDx2 to [RAID 0] HDDx3 [RAID 1] HDDx2 to [RAID 0] HDDx4 [RAID 1] HDDx2 to [RAID 0] HDDx5 [RAID 1] HDDx2 to [RAID 0] HDDx6 [RAID 1] HDDx2 to [RAID 0] HDDx7 [RAID 1] HDDx2 to [RAID 0] HDDx8 [RAID 1] HDDx3 to [RAID 0] HDDx4 [RAID 1] HDDx3 to [RAID 0] HDDx5 [RAID 1] HDDx3 to [RAID 0] HDDx6 [RAID 1] HDDx3 to [RAID 0] HDDx7 [RAID 1] HDDx3 to [RAID 0] HDDx8 [RAID 1] HDDx4 to [RAID 0] HDDx5 [RAID 1] HDDx4 to [RAID 0] HDDx6 [RAID 1] HDDx4 to [RAID 0] HDDx7 [RAID 1] HDDx4 to [RAID 0] HDDx8 [RAID 1] HDDx5 to [RAID 0] HDDx6 [RAID 1] HDDx5 to [RAID 0] HDDx7 [RAID 1] HDDx5 to [RAID 0] HDDx8 [RAID 1] HDDx6 to [RAID 0] HDDx7	[ONLINE] [RAID 1] HDDx2 to [RAID 5] HDDx3 [RAID 1] HDDx2 to [RAID 5] HDDx4 [RAID 1] HDDx2 to [RAID 5] HDDx5 [RAID 1] HDDx2 to [RAID 5] HDDx6 [RAID 1] HDDx2 to [RAID 5] HDDx7 [RAID 1] HDDx2 to [RAID 5] HDDx8 [RAID 1] HDDx3 to [RAID 5] HDDx4 [RAID 1] HDDx3 to [RAID 5] HDDx5 [RAID 1] HDDx3 to [RAID 5] HDDx6 [RAID 1] HDDx3 to [RAID 5] HDDx7 [RAID 1] HDDx3 to [RAID 5] HDDx8 [RAID 1] HDDx4 to [RAID 5] HDDx5 [RAID 1] HDDx4 to [RAID 5] HDDx6 [RAID 1] HDDx4 to [RAID 5] HDDx7 [RAID 1] HDDx4 to [RAID 5] HDDx8 [RAID 1] HDDx5 to [RAID 5] HDDx6 [RAID 1] HDDx5 to [RAID 5] HDDx7 [RAID 1] HDDx5 to [RAID 5] HDDx8 [RAID 1] HDDx6 to [RAID 5] HDDx7 [RAID 1] HDDx6 to [RAID 5] HDDx8	[ONLINE] [RAID 1] HDDx2 to [RAID 6] HDDx4 [RAID 1] HDDx2 to [RAID 6] HDDx5 [RAID 1] HDDx2 to [RAID 6] HDDx6 [RAID 1] HDDx2 to [RAID 6] HDDx7 [RAID 1] HDDx2 to [RAID 6] HDDx8 [RAID 1] HDDx3 to [RAID 6] HDDx4 [RAID 1] HDDx3 to [RAID 6] HDDx5 [RAID 1] HDDx3 to [RAID 6] HDDx6 [RAID 1] HDDx3 to [RAID 6] HDDx7 [RAID 1] HDDx3 to [RAID 6] HDDx8 [RAID 1] HDDx4 to [RAID 6] HDDx5 [RAID 1] HDDx4 to [RAID 6] HDDx6 [RAID 1] HDDx4 to [RAID 6] HDDx7 [RAID 1] HDDx4 to [RAID 6] HDDx8 [RAID 1] HDDx5 to [RAID 6] HDDx6 [RAID 1] HDDx5 to [RAID 6] HDDx7 [RAID 1] HDDx5 to [RAID 6] HDDx8 [RAID 1] HDDx6 to [RAID 6] HDDx7 [RAID 1] HDDx6 to [RAID 6] HDDx8 [RAID 1] HDDx7 to [RAID 6] HDDx8

	[RAID 1] HDDx6 to [RAID 0] HDDx8 [RAID 1] HDDx7 to [RAID 0] HDDx8	[RAID 1] HDDx7 to [RAID 5] HDDx8	
RAID 5	X	[ONLINE] [RAID 5] HDDx3 to [RAID 5] HDDx4 [RAID 5] HDDx3 to [RAID 5] HDDx5 [RAID 5] HDDx3 to [RAID 5] HDDx6 [RAID 5] HDDx3 to [RAID 5] HDDx7 [RAID 5] HDDx3 to [RAID 5] HDDx8 [RAID 5] HDDx4 to [RAID 5] HDDx5 [RAID 5] HDDx4 to [RAID 5] HDDx6 [RAID 5] HDDx4 to [RAID 5] HDDx7 [RAID 5] HDDx4 to [RAID 5] HDDx8 [RAID 5] HDDx5 to [RAID 5] HDDx6 [RAID 5] HDDx5 to [RAID 5] HDDx7 [RAID 5] HDDx5 to [RAID 5] HDDx8 [RAID 5] HDDx6 to [RAID 5] HDDx7 [RAID 5] HDDx6 to [RAID 5] HDDx8 [RAID 6] HDDx7 to [RAID 6] HDDx8	X
RAID 6	X	X	[ONLINE] [RAID 6] HDDx4 to [RAID 6] HDDx5 [RAID 6] HDDx4 to [RAID 6] HDDx6 [RAID 6] HDDx4 to [RAID 6] HDDx7 [RAID 6] HDDx4 to [RAID 6] HDDx8 [RAID 6] HDDx5 to [RAID 6] HDDx6 [RAID 6] HDDx5 to [RAID 6] HDDx7 [RAID 6] HDDx5 to [RAID 6] HDDx8 [RAID 6] HDDx6 to [RAID 6] HDDx7 [RAID 6] HDDx6 to [RAID 6] HDDx8 [RAID 6] HDDx7 to [RAID 6] HDDx8

Space Allocation

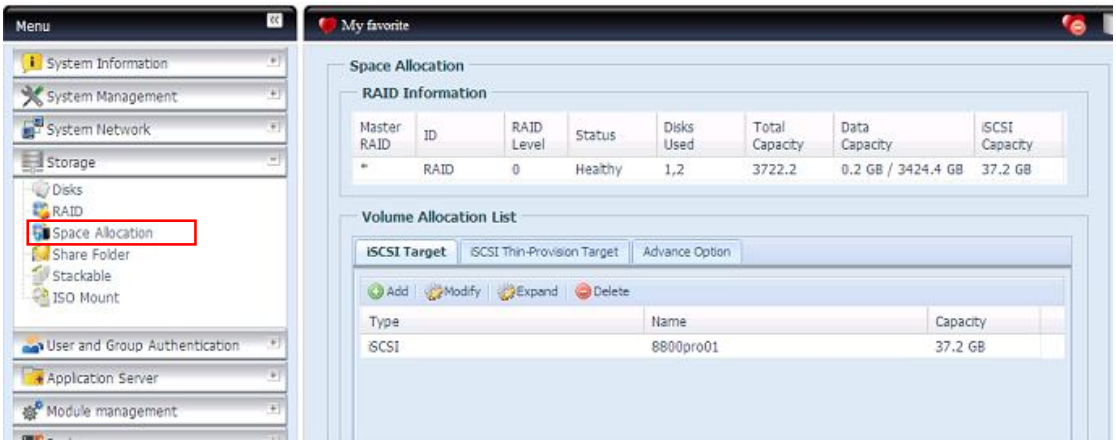
iSCSI Target

You may specify the space allocated for iSCSI or target USB volumes (target USB is available in model N5500 and 1U4600). The iSCSI volume can be created from 5 to 25 volumes per system depend on Thecus IP storage's model.

Model	N0503	N4200 series	N5500 1U4600	N7700 N7700+ N8800 N8800+	N7700PRO N7700SAS N8800PRO N8800SAS
Allow iSCSI volume	5	5	10	15	25

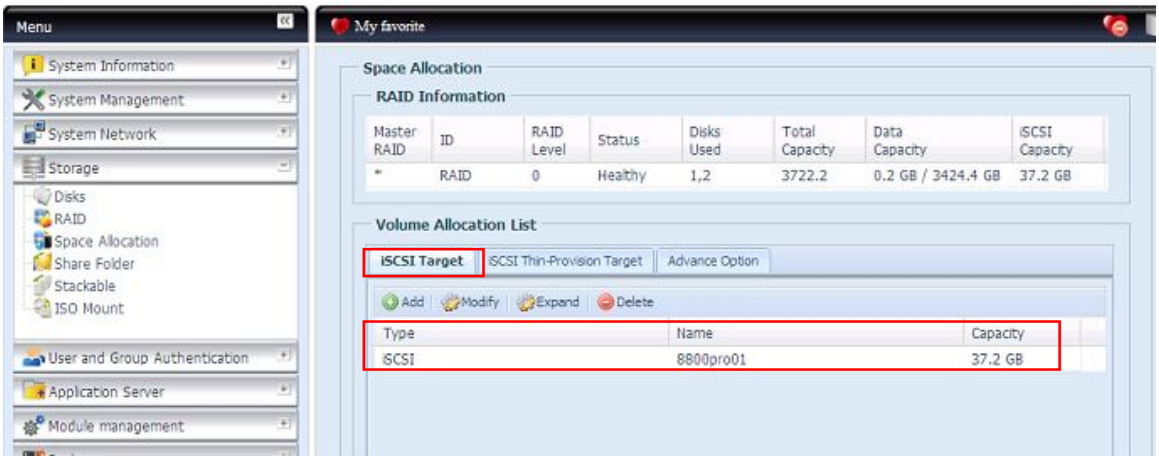
To do this, under the **Storage** menu, click ***RAID*** and the **RAID List** window appears. Select the RAID volume you wish to reallocate by clicking on its radio button, and click ***Space Allocation***. The **RAID Information** and **Volume Allocation List** windows will appear.

The Volume Allocation List displays the space allocated for **iSCSI** volumes on the current RAID volume.



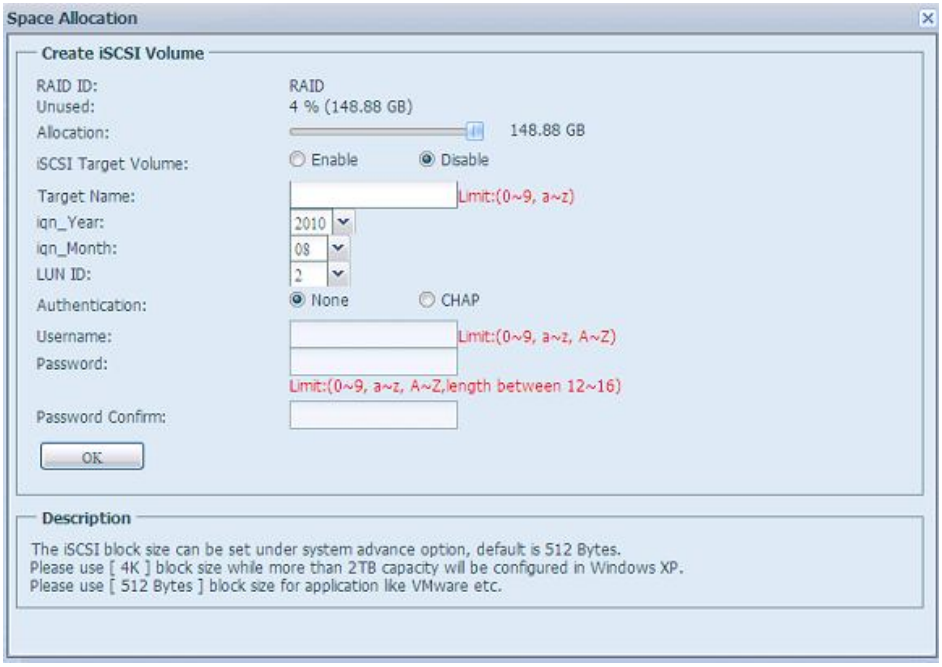
Volume Allocation List	
Item	**Description**
Modify	Click this to modify the allocated space.
Delete	Click this to delete the allocated space.
iSCSI Target	Click to allocate space to iSCSI volume.
Type	Type of volume. Can be either USB or iSCSI.
Name	Name assigned to the volume.
Capacity	Capacity of the allocated space.

Allocating Space for iSCSI Volume



To allocate space for an iSCSI volume on the current RAID volume, follow the steps below:

1. Under the **Volume Allocation List**, select ***iSCSI Target then click Add***. The **Create iSCSI Volume** screen appears.



Create iSCSI Volume	
Item	**Description**
RAID ID	ID of current RAID volume.
Allocation	Percentage and amount of space allocated to iSCSI volume.
Unused	Percentage and amount of unused space on current RAID volume.
iSCSI Target Volume	Enable or Disable the iSCSI Target Volume.
Target Name	Name of the iSCSI Target. This name will be used by the **Stackable NAS** function to identify this export share.
Year	Select the current year from the dropdown.
Authentication	You may choose CHAP authentication or choose None.
Month	Select the current month from the dropdown.

LUN ID	Specific Logic unit ID number.
Username	Enter a username.
Password	Enter a password.
Password Confirm	Reenter the chosen password

2. Designate the percentage to be allocated from the **Allocation** drag bar.

3. Enable the **iSCSI Target Service** by selecting ***Enable***.

4. Choose to enable ***CHAP*** authentication or choose ***None***.

5. Enter a **Target Name**. This will be used by the **Stackable NAS** function to identify this export share.

6. Choose the current year from the **Year** dropdown.

7. Choose the current month from the **Month** dropdown.

8. When iSCSI target volume has been created, the LUN ID is configurable from 1 to 254 with a default of the next available number in ascending numerical order. The LUN ID is unique and can not be duplicated except for LUN ID 0.

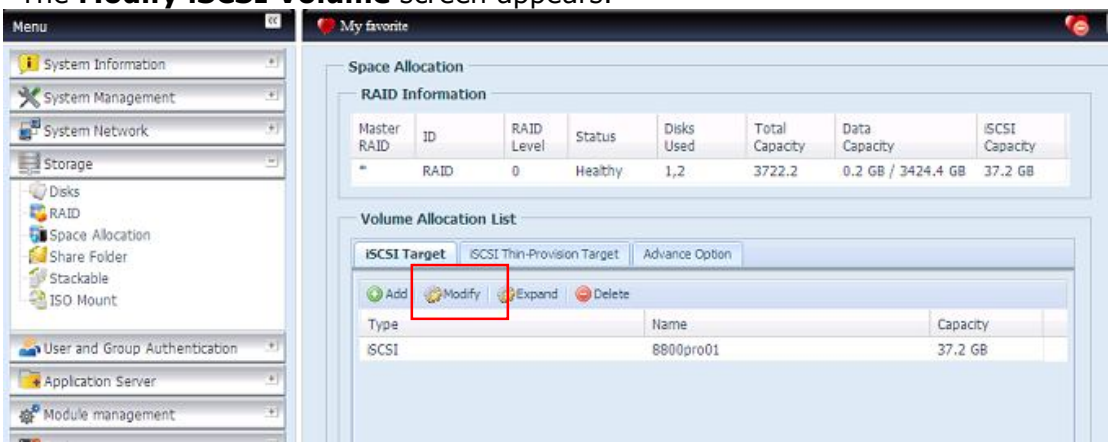
9. If you've enabled CHAP authentication, enter a **username** and a **password**. Confirm your chosen password be reentering it in the **Password Confirm** box.

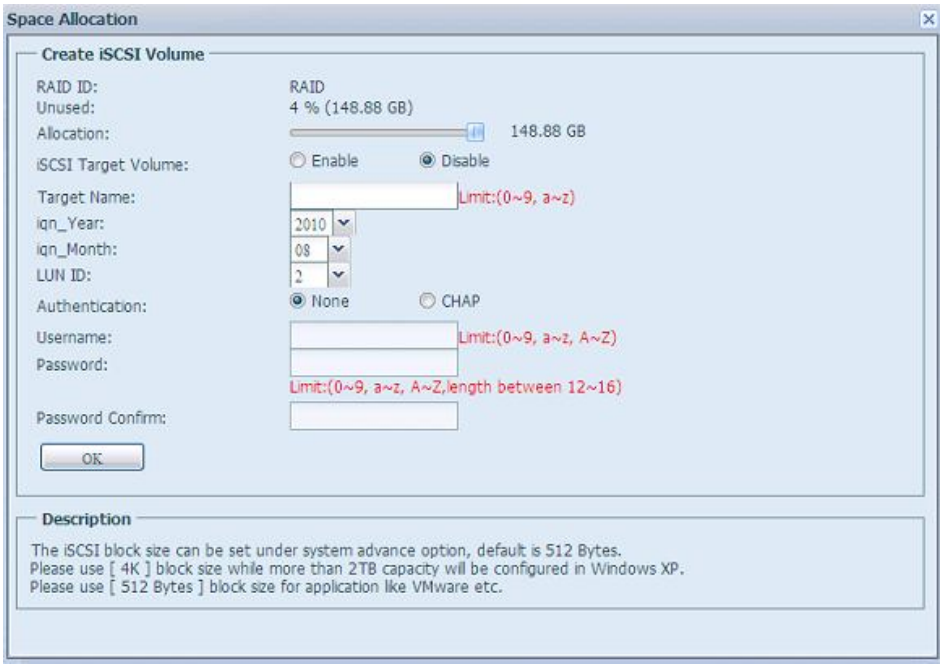
10. Click ***OK*** to create the iSCSI volume.

Modify iSCSI Volume

To Modify iSCSI volume on the current RAID volume, follow the steps below:

1. Under the **Volume Allocation List**, click ***Modify***.
   The **Modify iSCSI Volume** screen appears.

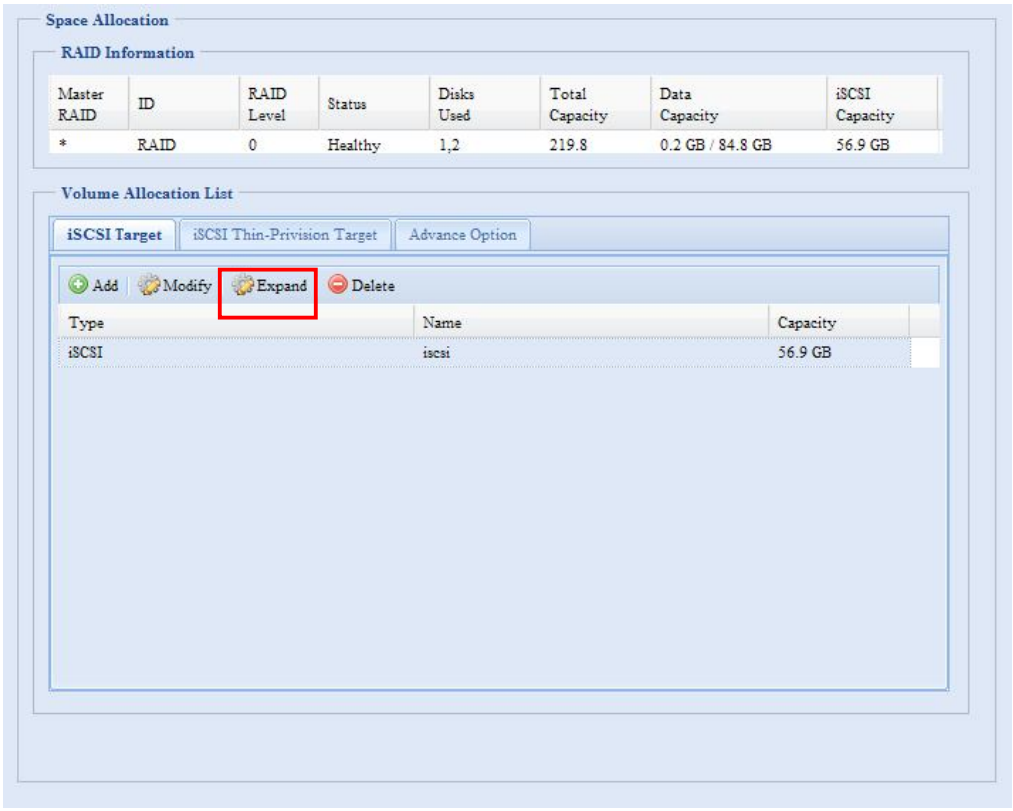




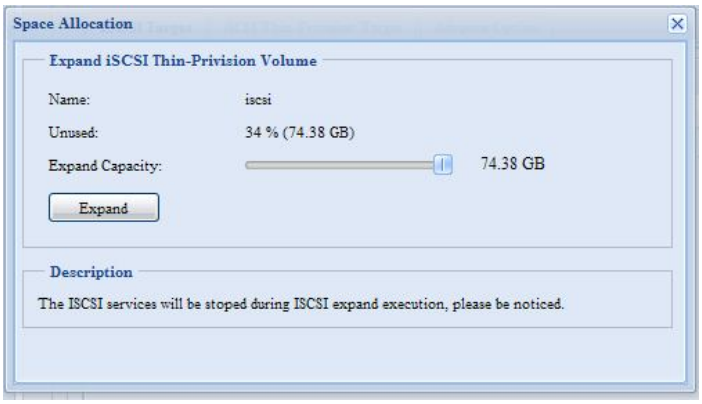
2. Modify your setting. Press **ok** to change.

Expand Volume

The iSCSI volume is now able to expand its capacity from unused space. From the volume list, simply select the iSCSI volume you like to expand and click the **Expand** button:



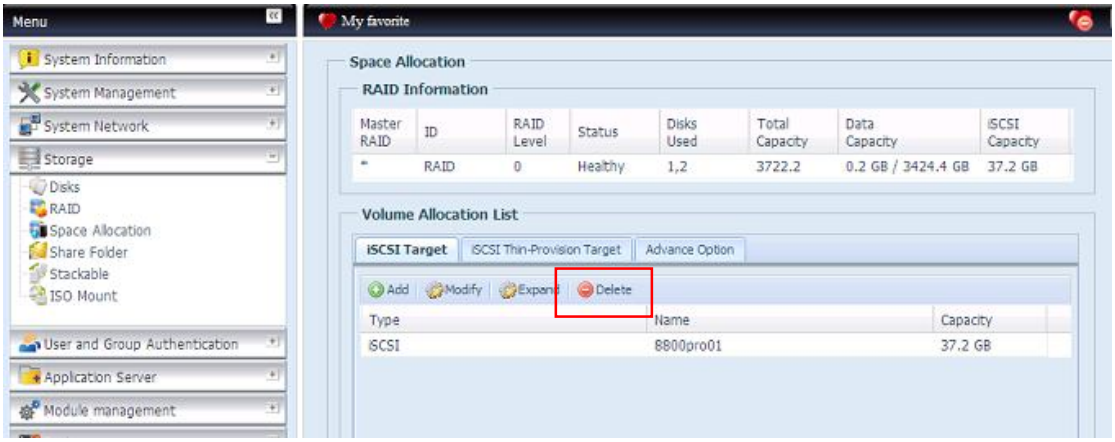
You will then see the dialog box displayed below. Drag the **Expand Capacity** bar to the size you want. Then press **Expand** to confirm the operation.

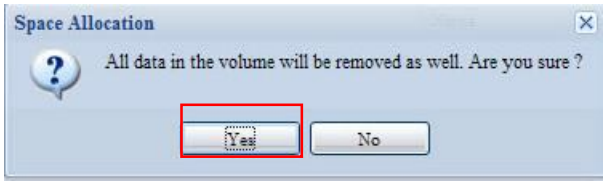


Delete Volume

To delete volume on the current RAID volume, follow the steps below:

1. Under the **Volume Allocation List**, click ***Delete***.
   The **Space Allocation** screen appears.





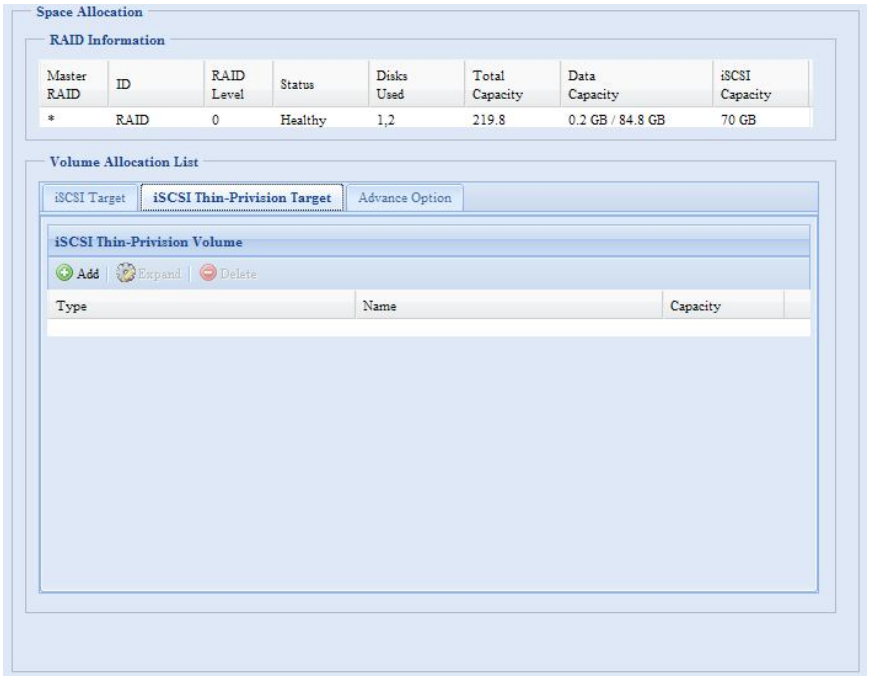
2. Press **YES**. All data in the volume will be removed.

iSCSI Thin-Provisioning

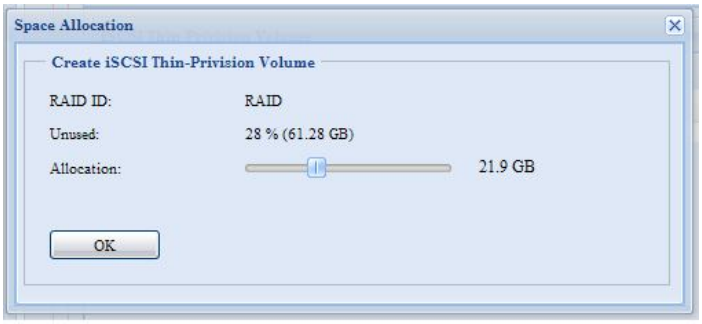
With this function, the iSCSI capacity can be more flexible and more efficiently serve more users.

The idea for iSCSI thin-provisioning is sharing the available physical capacity to a number of iSCSI target volumes and also setup virtual capacity to expand the physical size while it needed.

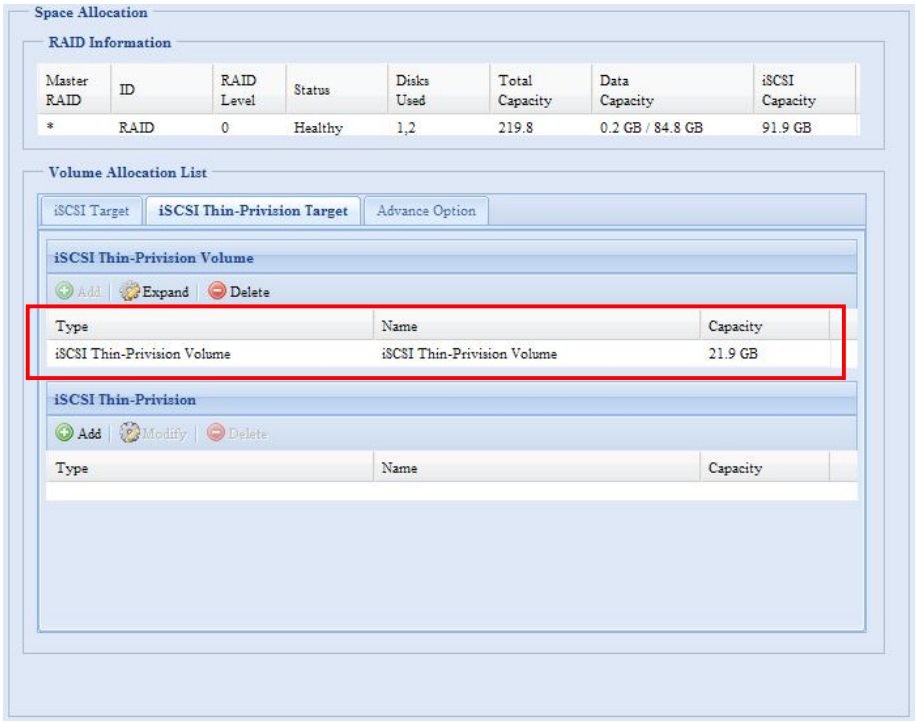
To setup iSCSI thin-provisioning, go to **Space Allocation** under the **Storage** category. The iSCSI thin-provisioning volume needs to be created first. Simply click **iSCSI Thin-Provision Target.** You can refer the screen shot below.



Next, setup the physical capacity for iSCSI thin-provision volume by dragging the **Allocation** bar to the desired size.



After the size has been determined, click **OK** to confirm. Now you will see the iSCSI thin-provisioning volume is available from the list. Please refer to the screenshot below.



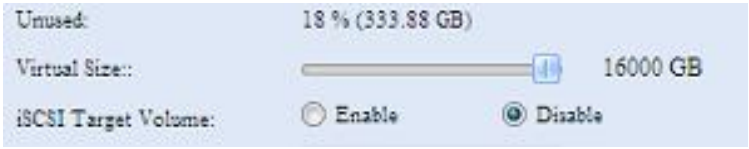
Now you can start to create iSCSI targets to join the newly-created iSCSI thin-provision volume. Basically, the iSCSI target under iSCSI thin-provisioning has exactly same settings screen as the standard iSCSI target volume creation. The only difference is the "Virtual Size" of capacity.

Unlike creating standard iSCSI target volumes, the capacity has been physically allocated. The iSCSI target volume creation under thin-provisioning can virtually be up to 16000GB (16TB).

Let's take the example below:

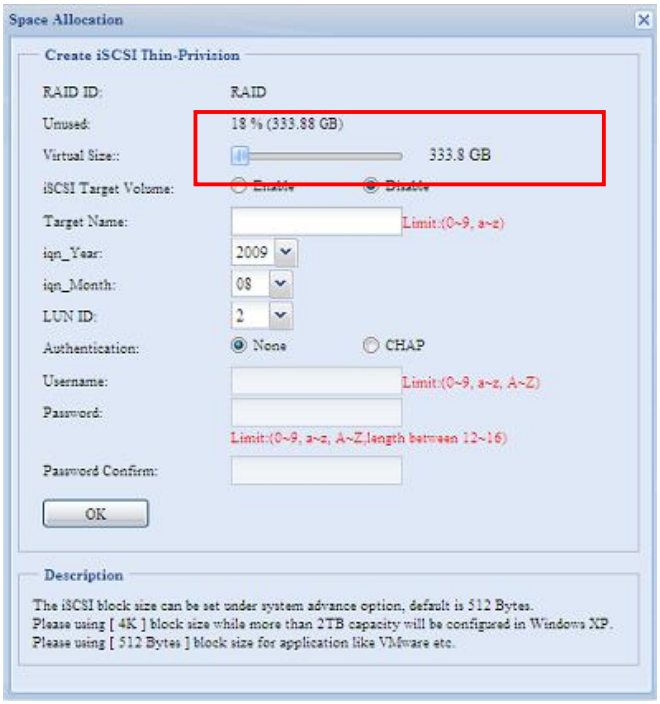
1. The physical size for the iSCSI thin-provision volume is 333.88GB. You can refer the screenshot above.
2. The iSCSI target volume under thin-provisioning starts with 333.38GB in physical size and you may use drag the Virtual Size bar to select the desired virtual size. The maximum virtual size is 16000GB.
3. In this case, if you make the iSCSI target volume 1700GB, then the virtual size is available for the next iSCSI target volume under thin-provisioning is 14300GB (16000-1700).
4. The limit is 5 iSCSI target volumes under thin-provisioning or a virtual size of 16000GB.

iSCSI Thin-provision physical size starts with 333.8GB

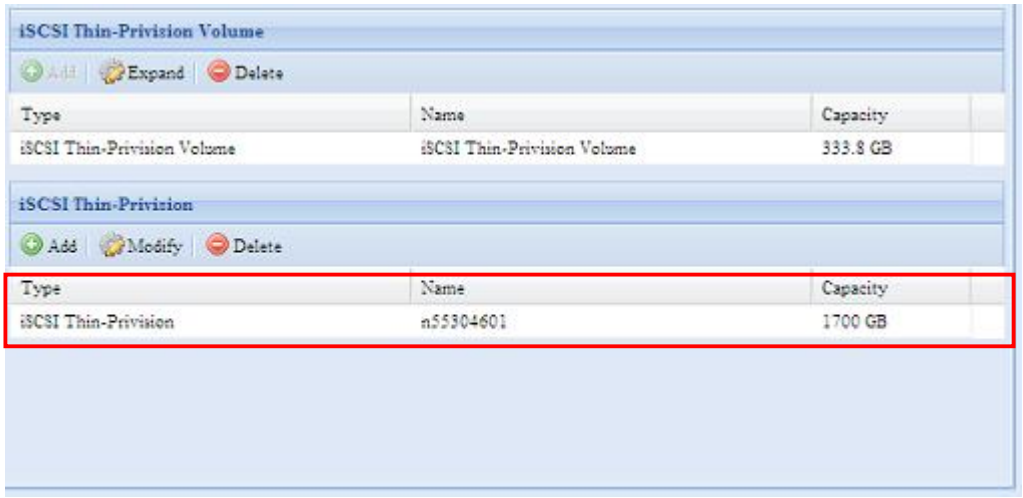


The virtual capacity is limited to 16000GB

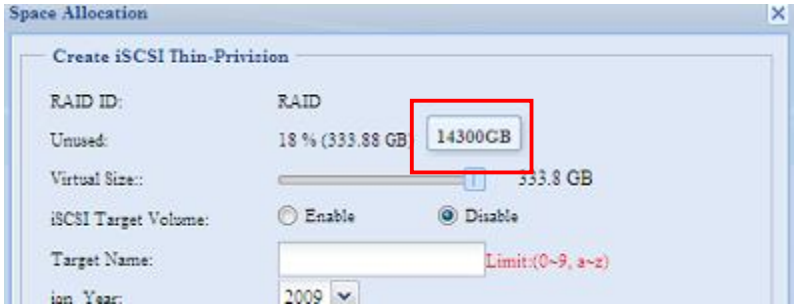
The screen shot for iSCSI target volume creation under thin-provisioning; the physical capacity 333.8GB.



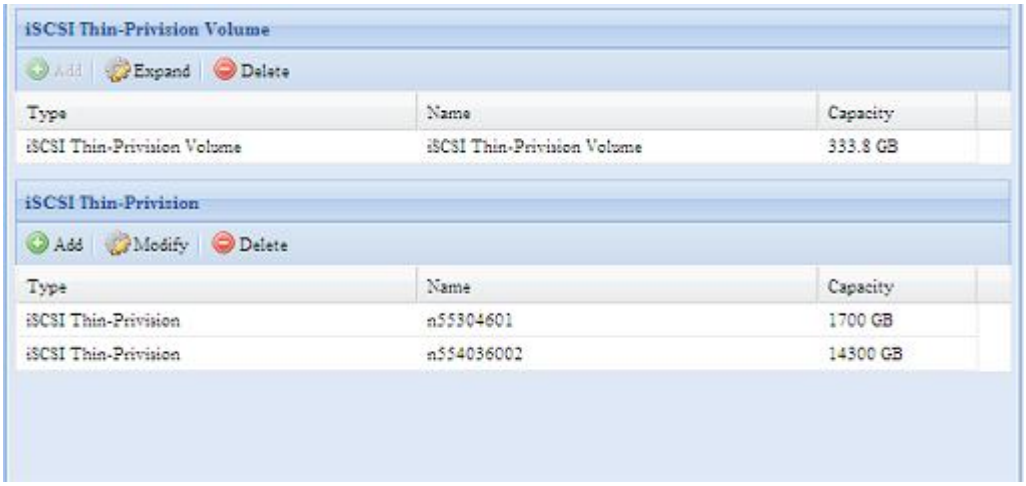
The screen shot to setup an iSCSI target volume under thin-provisioning of 1700GB.



iSCSI target volume creation. The maximum virtual size is 14300GB (16000GB – 1700GB(1st iSCSI target volume)).



This screenshot lists iSCSI target volumes created under thin-provisioning. The 2nd iSCSI target volume under thin-provisioning has been created with a capacity of 14300GB.



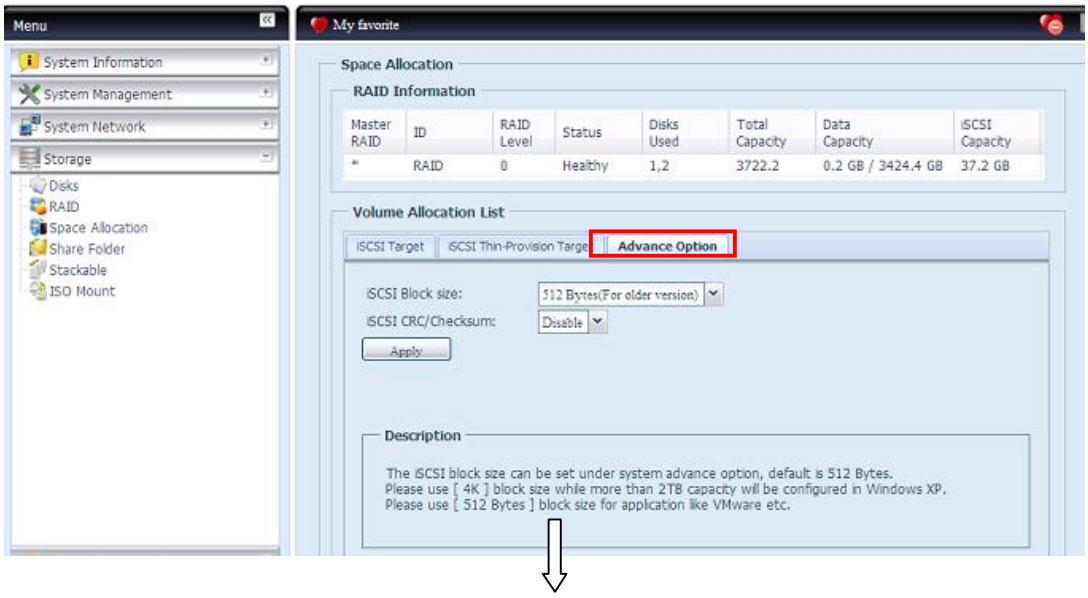
This message appears if there is no more room for new iSCSI target creation.

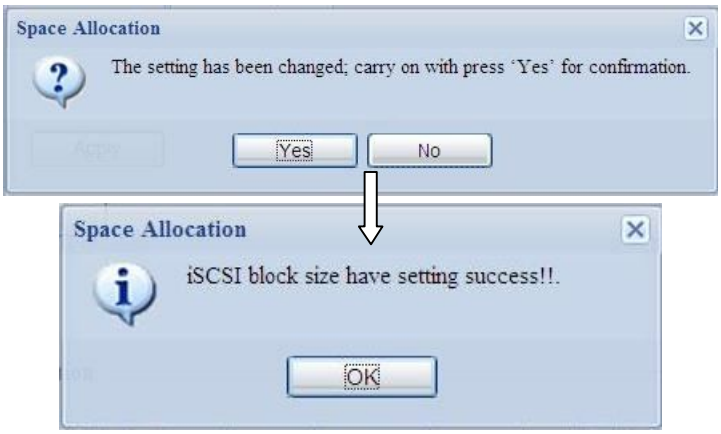
NOTE

1. Each RAID volume can only create one iSCSI thin-provision volume.
2. Each thin-provision volume can only create 5 iSCSI target volumes.
3. The notification will send out while the physical size of iSCSI thin-provision capacity has used up to 90%.

Advance Option

There are 2 options is currently allow Admin to Enable/Disable to operate Thecus IP storage associated with iSCSI setting. The details as listed in following screenshot. With the option changed, it will need to reboot system to activate.



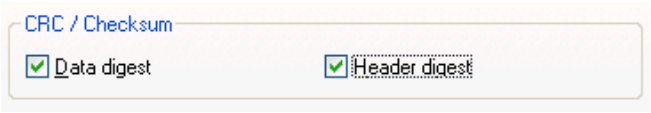


iSCSI Block Size

Select the block size with 4K while the iSCSI volume size is over 2TB.

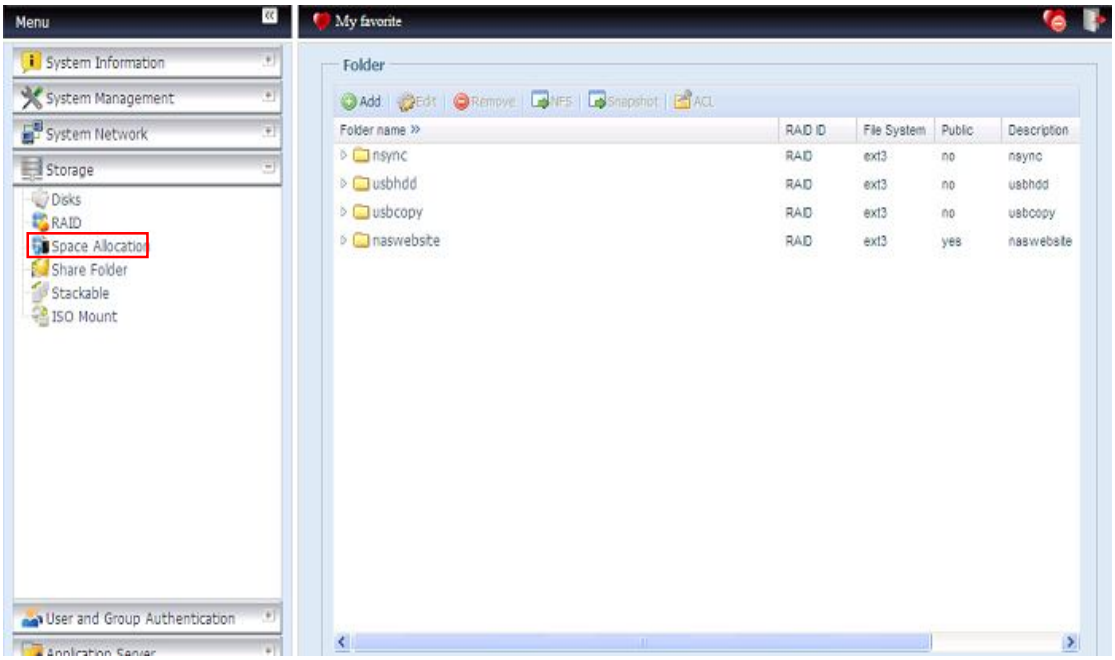
iSCSI CRC/Checksum

To enable this option, the initiator can connect with "Data digest" and "Header digest" enabled.



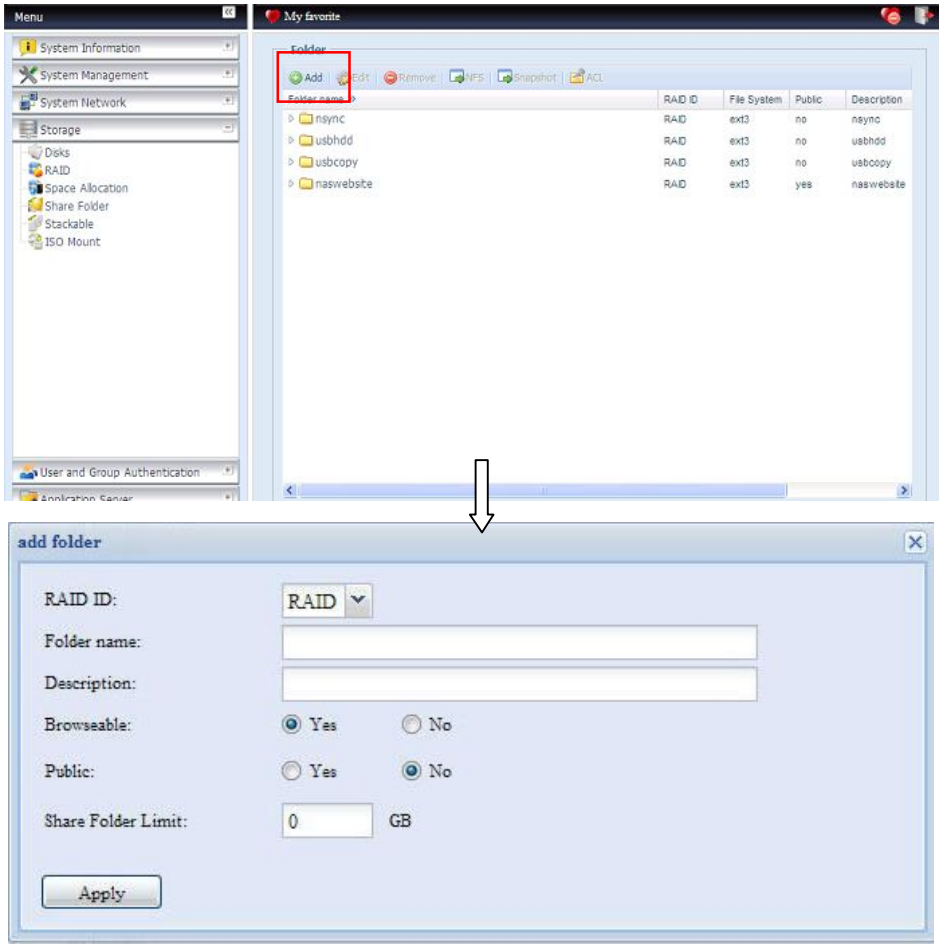
Share Folder

From the **Storage** menu, choose **Share *Folder***, and the **Folder** screen appears. This screen allows you to create and configure folders on the Thecus IP storage volume.



Adding Folders

On the **Folder** screen, press the ***Add*** button and the **Add Folder** screen appears. This screen allows you to add a folder. After entering the information, press ***Apply*** to create new folder.



Add Folder	
Item	**Description**
RAID ID	RAID volume where the new folder will reside.
Folder Name	Enter the name of the folder.
Description	Provide a description the folder.
Browseable	Enable or disable users from browsing the folder contents. If **Yes** is selected, then the share folder will be browseable.
Public	Admit or deny public access to this folder. If **Yes** is selected, then users do not need to have access permission to write to this folder. When accessing a public folder via FTP, the behavior is similar to anonymous FTP. Anonymous users can upload/download a file to the folder, but they cannot delete a file from the folder.
Share Folder Limit	Enter the maximum size of the folder in Gigabytes (GB). The folder cannot grow beyond this limit. You can enter a 0 to turn off the share folder limit. This option did not apply while XFS file system selected.
Apply	Press ***Apply*** to create the folder.

NOTE Folder names are limited to 60 characters. Systems running Windows 98 or earlier may not support file names longer than 15 characters.

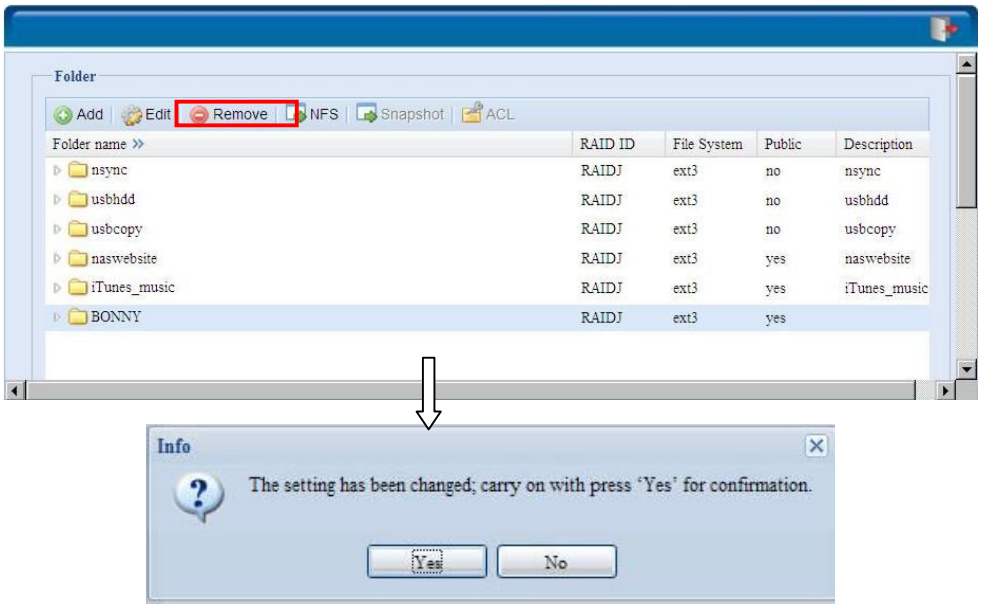
Modify Folders

On the **Folder** screen, press the ***Edit*** button and the **Modify Folder** screen appears. This screen allows you to change folder information. After entering the information, press **Apply** to save your changes.

Modify Folder	
Item	**Description**
RAID ID	RAID volume where the folder will reside.
Folder Name	Enter the name of the folder.
Description	Provide a description the folder.
Browseable	Enable or disable users from browsing the folder contents. This setting will only apply while access via SMB/CIFS and web disk.
Public	Admit or deny public access to this folder.
Share Limit	Enter the maximum size of the folder. The folder will not grow beyond this limit. You can enter a 0 to turn off the share folder limit.

Remove Folders

To remove a folder, press the ***Remove*** button from the specified folder row. The system will confirm folder deletion. Press ***Yes*** to delete the folder permanently or ***No*** to go back to the folder list.

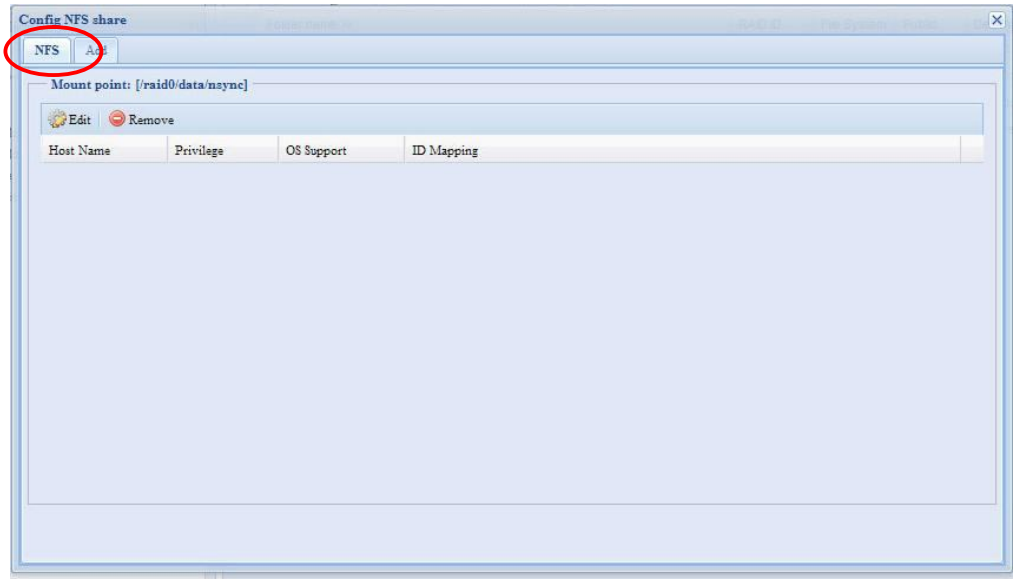


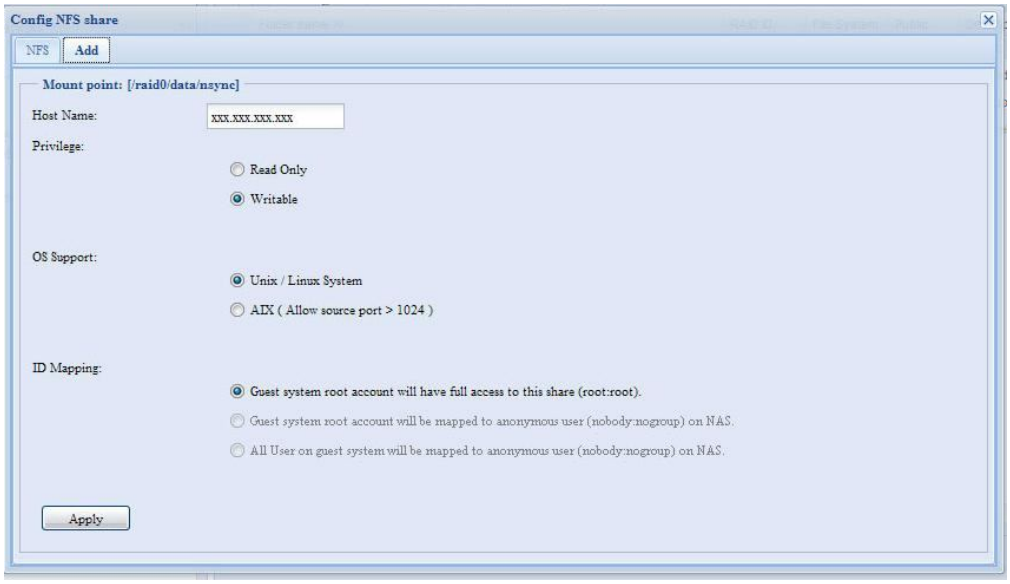
WARNING

All the data stored in the folder will be deleted once the folder is deleted. The data will not be recoverable.

NFS Share

To allow NFS access to the share folder, enable the **NFS Service**, and then set up hosts with access rights by clicking ***Add***.



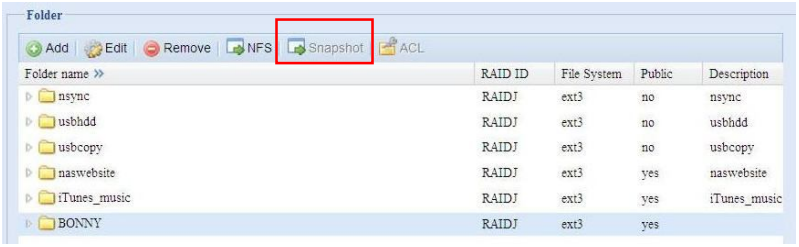

Config NFS share
NFS
Add
Mount point: [/raid0/data/nsync]
Host Name:
xxx.xxx.xxx.xxx
Privilege:
Read Only
Writable
OS Support:
Unix / Linux System
AIX (Allow source port > 1024)
ID Mapping:
Guest system root account will have full access to this share (root:root).
Guest system root account will be mapped to anonymous user (nobody:nogroup) on NAS.
All User on guest system will be mapped to anonymous user (nobody:nogroup) on NAS.
Apply

NFS Share	
Item	**Description**
Hostname	Enter the name or IP address of the host
Privilege	Host has either read only or writeable access to the folder.
Guest System Support	There are two selections available: • Unix / Linux System • AIX (Allow source port > 1024) Choose the one which best fits your needs.
IO Mapping	There are three selections available:

	• Guest system root account will have full access to this share (root:root). • Guest system root account will be mapped to anonymous user (nobody:nogroup) on NAS. • All user on guest system will be mapped to anonymous user (nobody:nogroup) on NAS. Choose the one which best fits your needs.
Apply	Click to save your changes.

Snapshot

The Thecus IP storage is capable for 16 snapshot version control. To have snapshot to work on, the file system creation for RAID volume has to be "**ZFS**".

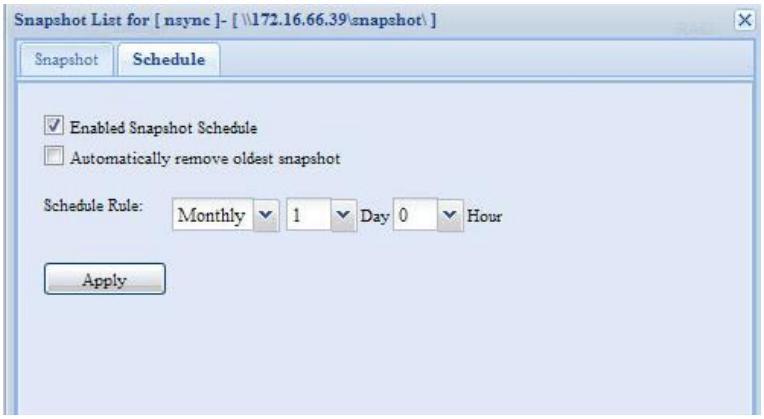


Snap (Snapshot configuration)

If added folder has located in the RAID volume with "ZFS" file system, then the folder management screen with "Snap" button will be configurable.

Snapshot	
Item	**Description**
Take Shot	Click to take snapshot right away.
Remove	Click to remove snapshot schedule.
Schedule	Click to open snapshot schedule setup screen.

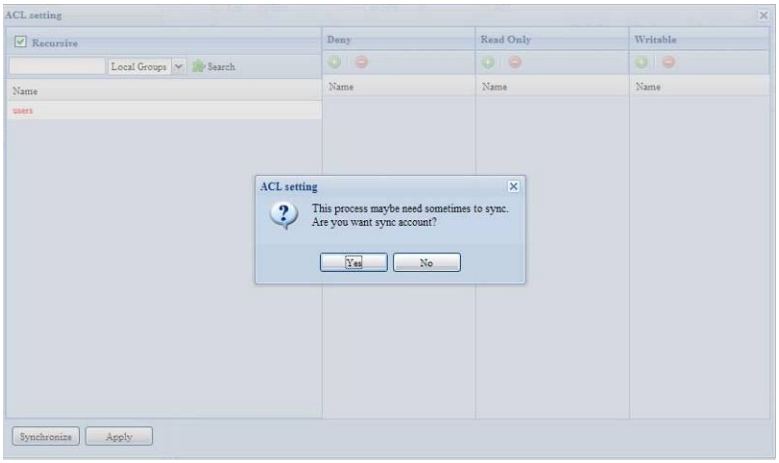
Clicking on schedule button then schedule setup screen appear. Checked the enable check box to activate the snapshot scheduled operation.

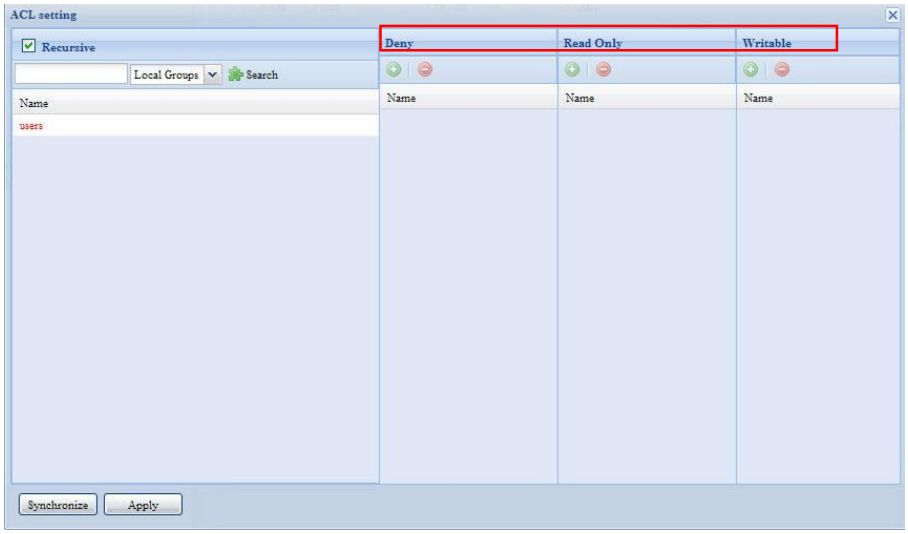


The Thecus IP storage snapshot is supported total **16 versions**. Once checked "Automatically remove oldest snapshot", the oldest will be removed to let newest to added on top. Otherwise, if the check box is unchecked and snapshot versions are up to 16 then system will appear warning message and won't execute the task till available version count.
The snapshot schedule rules can be setup for monthly, weekly or daily.
Clicking on ***Apply*** after firmed with desired schedule
These taken snapshot is only accessible though CIFS/SMB by manually type **\\NAS IP address\snapshot** and invisible from normal access. Also, the taken snapshot version is read only can not be deleted under CIFS/SMB access but only click the "Del" button showing on the screen shot above.

Folder and sub-folders Access Control List (ACL)

On the Folder screen, press the ***ACL*** button, and the **ACL setting** screen appears. This screen allows you to configure access to the specific folder and sub-folders for users and groups. Select a user or a group from the left hand column and then choose ***Deny***, ***Read Only***, or ***Writable*** to configure their access level. Press the ***Apply*** button to confirm your settings.





ACL setting	
Item	**Description**
Deny	Denies access to users or groups who are displayed in this column.
Read Only	Provides Read Only access to users or groups who are displayed in this column.
Writable	Provides Write access to users or groups who are displayed in this column.
Recursive	Enable to inherit the access right for all its sub-folders.

To configure folder access, follow the steps below:

1. On the **ACL** screen, all network groups and users are listed in the left hand column. Select a group or user from this list.

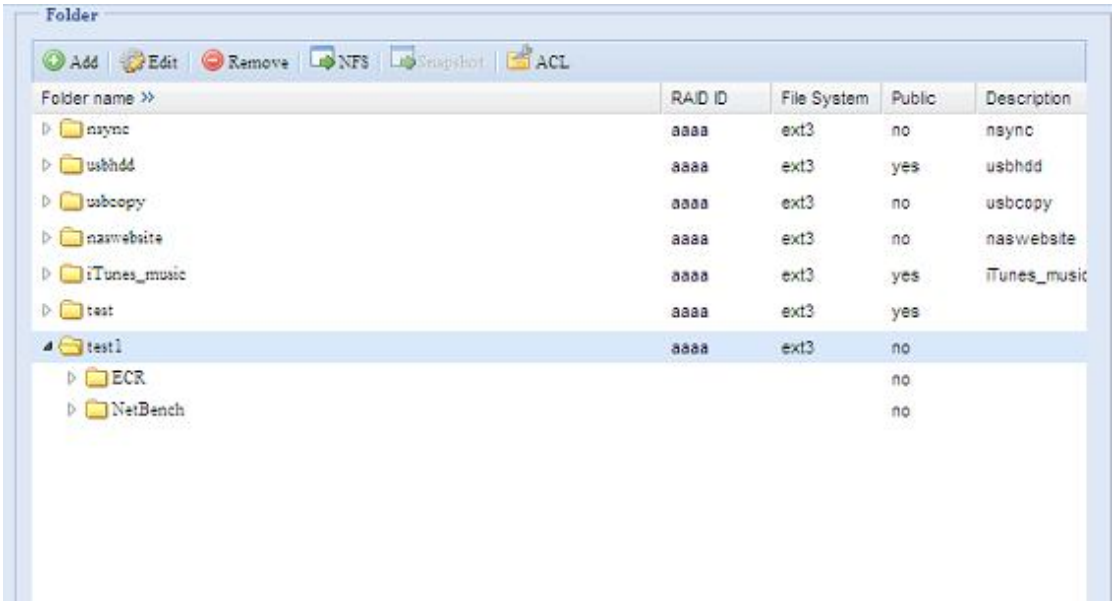
2. With the group or user selected, press one of the buttons from the three access level columns at the top. The group or user then appears in that column and has that level of access to the folder.

3. Continue selecting groups and users and assigning them access levels using the column buttons.
4. To remove a group or user from an access level column, press the ***Remove*** button in that column.

5. When you are finished, press ***Apply*** to confirm your ACL settings.

NOTE If one user has belonged to more than one group but different privilege than the priority Deny > Read Only > Writable

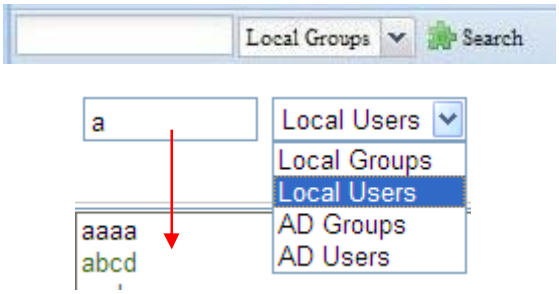
To setup sub-folders ACL, click on " ▷ " symbol to extract sub folders list as screen shot shows below. You may carry on with same steps as share level ACL setting.



NOTE The ACL can be set for share and sub-folders level, not for files.

The ACL screen also allows you to search for a particular user. To do this, follow the steps below:

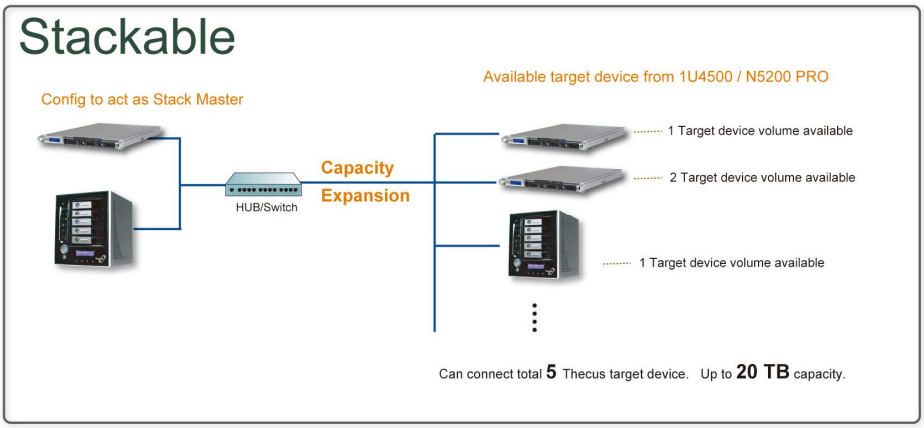
1. In the blank, enter the name of the user you would like to find.
2. From the drop down select the group you would like to search for the user in.
3. Click ***Search***.



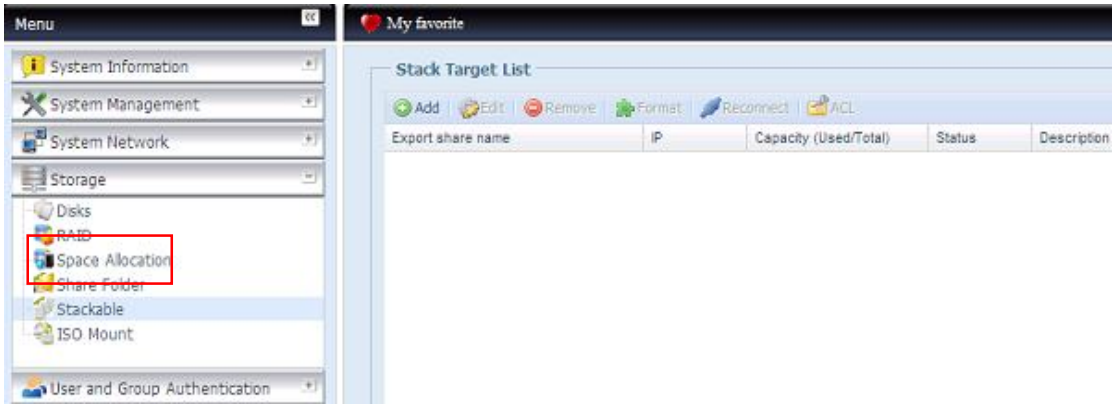
NOTE The system will list up to 1,000 users from the chosen category. To narrow your search, enter a search term in the blank provided.

Stackable NAS

The Thecus IP storage's capacity can be expanded even further using the stackable function. With it, users can expand the capacity of their network storage systems up to 5 other stack target volumes which are located in different systems. These can be stacked through single network access like SMB or AFP acting as a share folder type.


Stackable
Config to act as Stack Master
Available target device from 1U4500 / N5200 PRO
HUB/Switch
Capacity
Expansion
1 Target device volume available
2 Target device volume available
1 Target device volume available
Can connect total 5 Thecus target device. Up to 20 TB capacity.

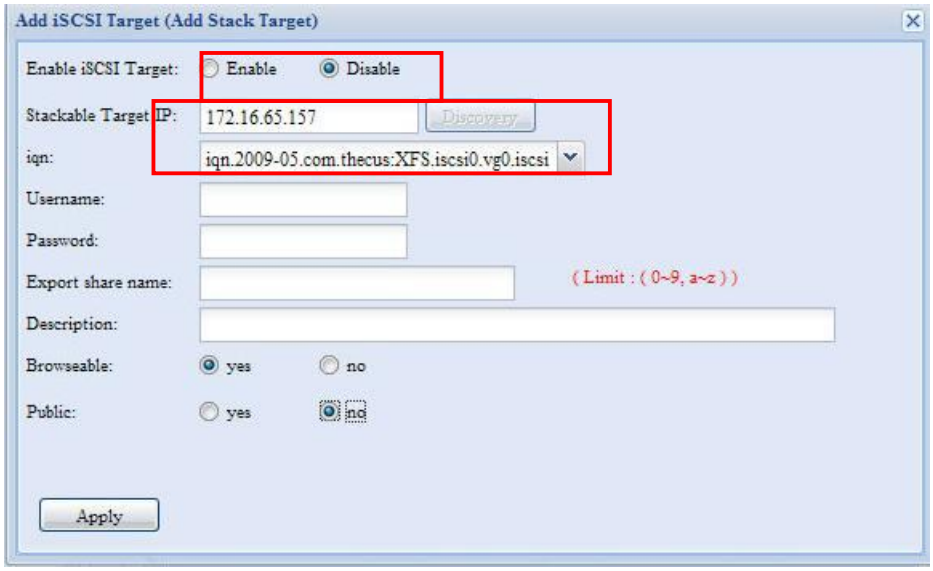
From the main menu, the stackable feature is located under "Storage". Please refer the figure below for reference.



A. *Add a Stack Target Volume*

From the figure above, click ***Add*** to access the stackable target device configuration page. Please refer to the figure below:

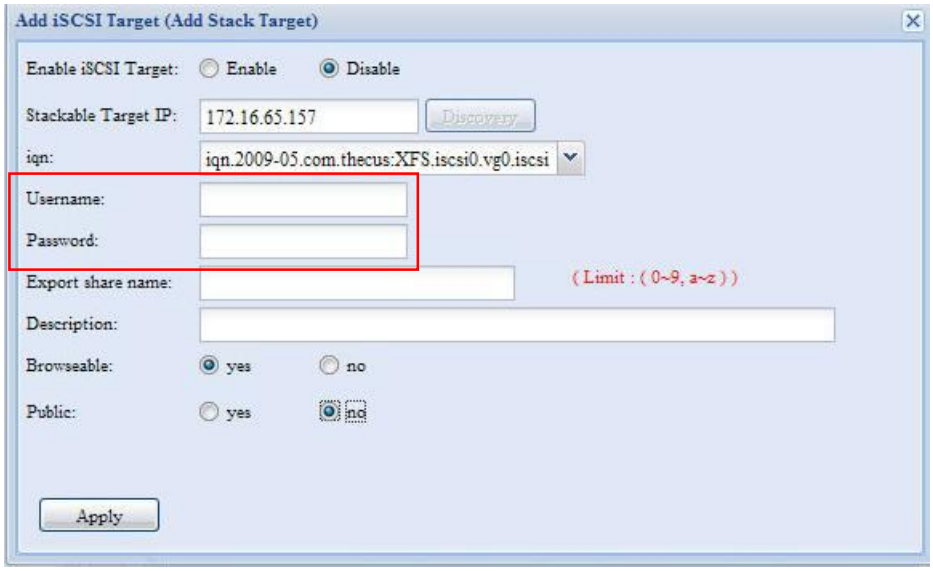
With the added stack target you could "Enable" or "Disable" now or later per usage needed.



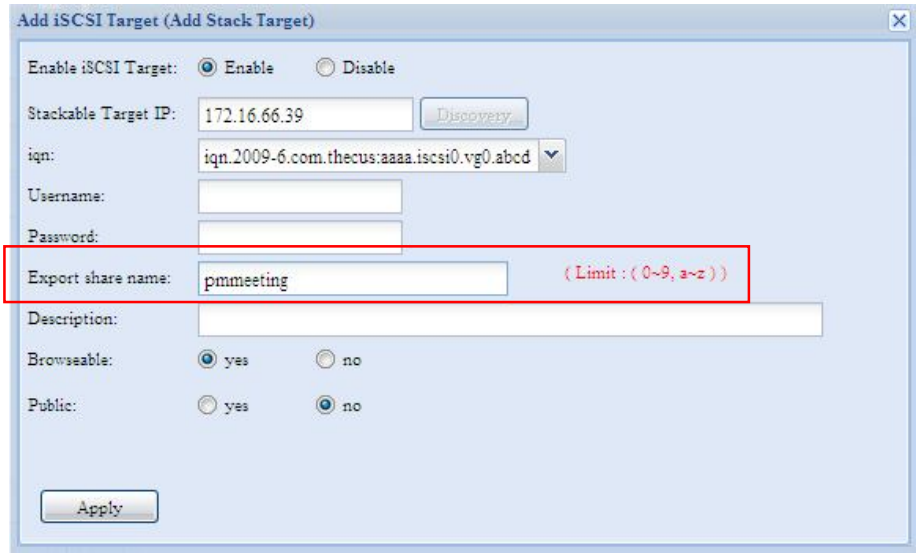
Next, input the target IP address of the stackable device and click the ***Discovery*** button. The system will list available target volumes from the inputted IP address.

Once IP with volume have been set, you may need to input a valid user name and password to validate your access rights. If there is no user name and password needed to access target volume, then leave it blank.

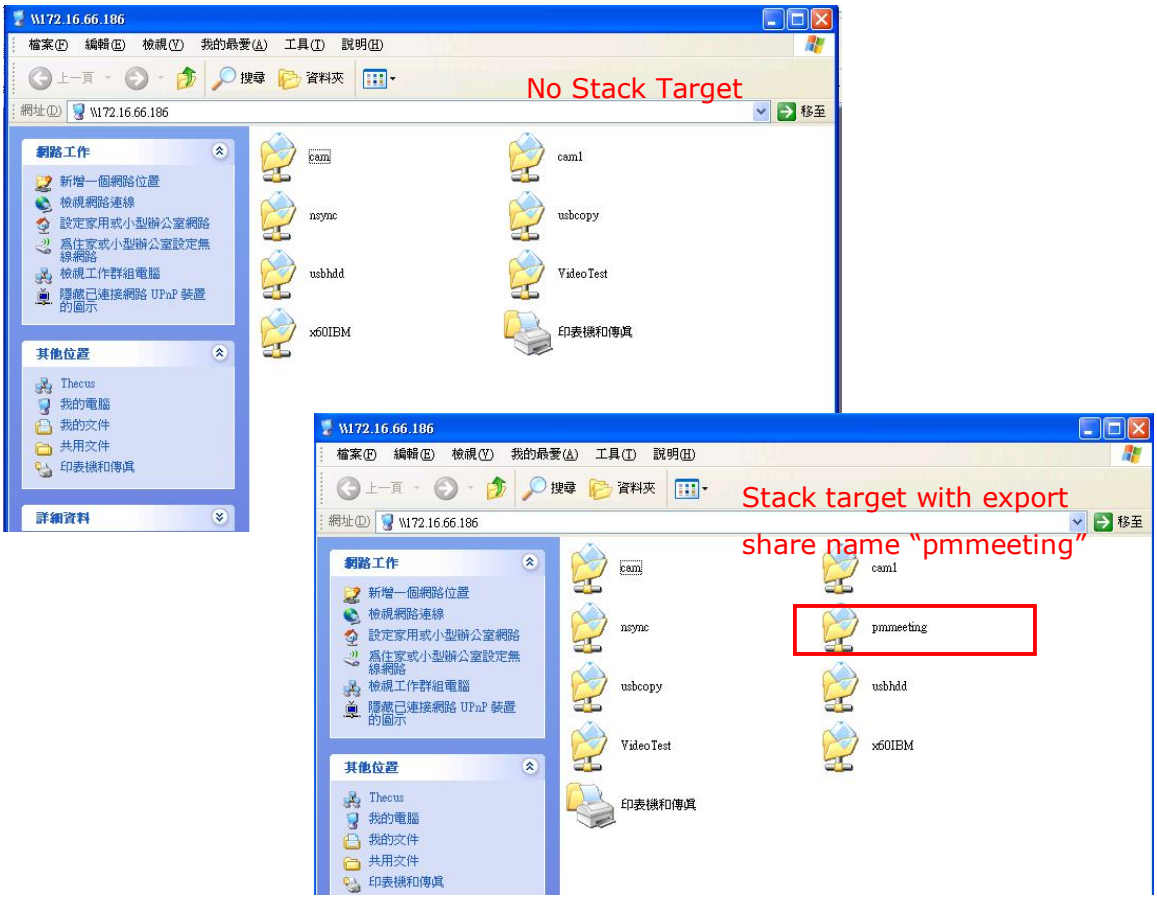
Once IP with volume have been set, you may need to input a valid user name and password to validate your access rights. If there is no user name and password needed to access target volume, then leave it blank.



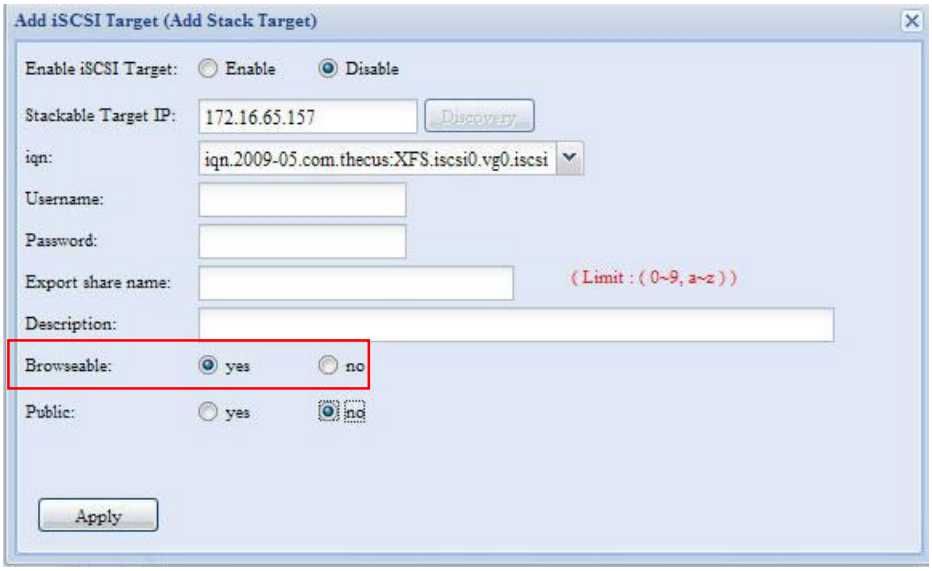
The **Export share name** will become the network share name and displayed through network access such as SMB. You may refer the figures below to see the result. Please note the naming limitation.



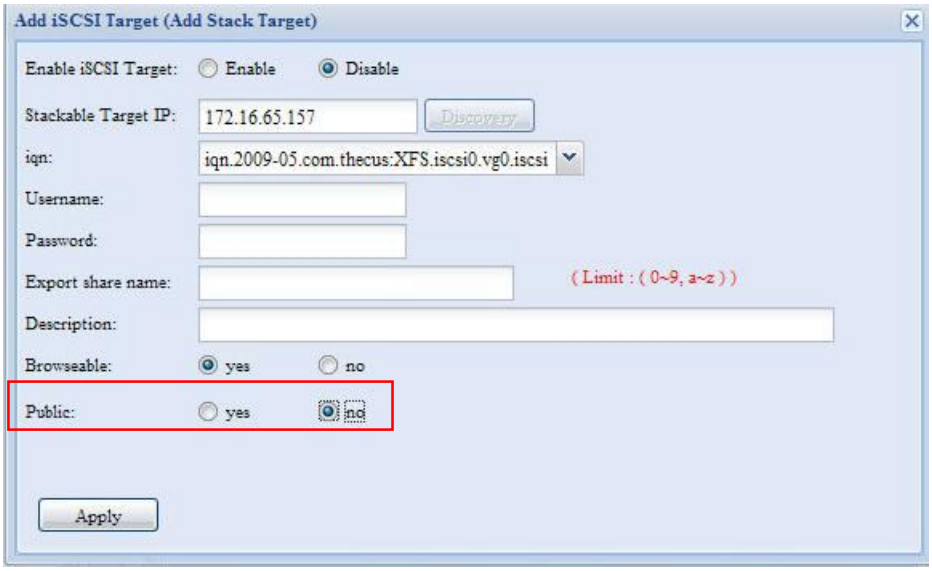
From the figure above, the **Export share name** is "pmmeeting". The figures below show the result before and after via Microsoft Network Access with settings have been completed.



The **Browseable** setting will be same method of setting for system share folder. It designates whether or not this folder will be visible through web disk. You may refer the figures below for reference when **Yes** and **No** are selected.



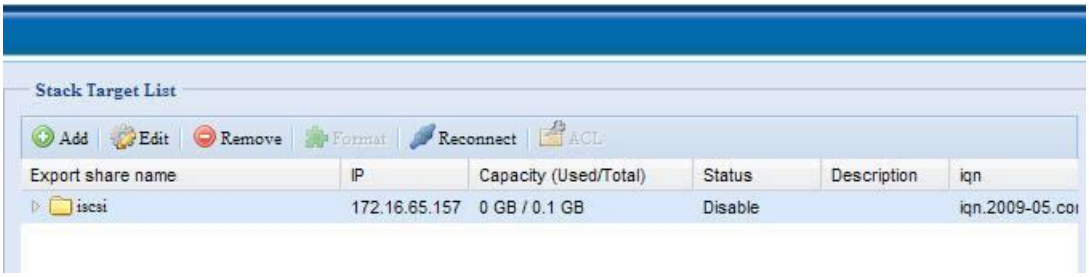
The **Public** setting will be set same as what the setting for the system share folder associated with the ACL permission setup. If **Public** is set to **Yes**, all users will be able to access it, and **ACL** button will be grayed out. If **Public** is set to **No**, the ACL button will be available on the **Stack Target List** window.

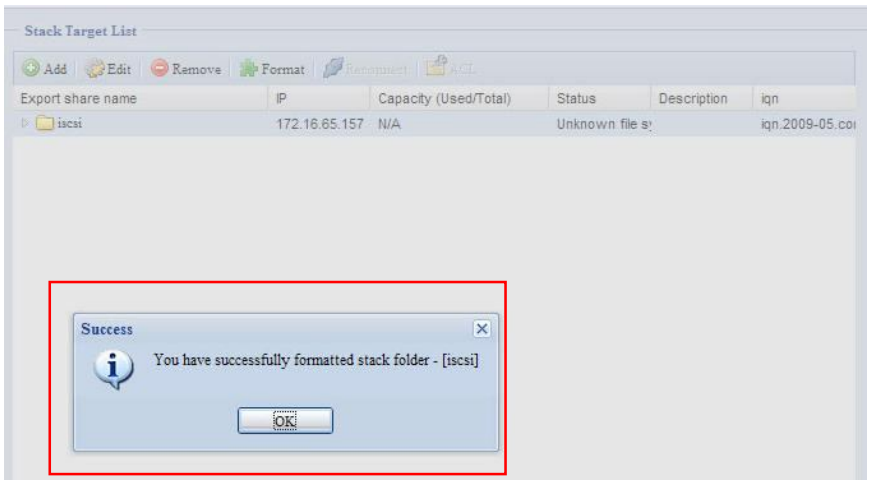


Click ***Apply*** to save your changes.

B. Activate a Stack Target

After your settings have been applied, the system will bring you back to **Stack Target List** window as shown below. There is one stack target device has been attached into this stack master.


Stack Target List
Add Edit Remove Format Reconnect ACL
Export share name IP Capacity (Used/Total) Status Description iqn
iscsi 172.16.65.157 0 GB / 0.1 GB Disable iqn.2009-05.co

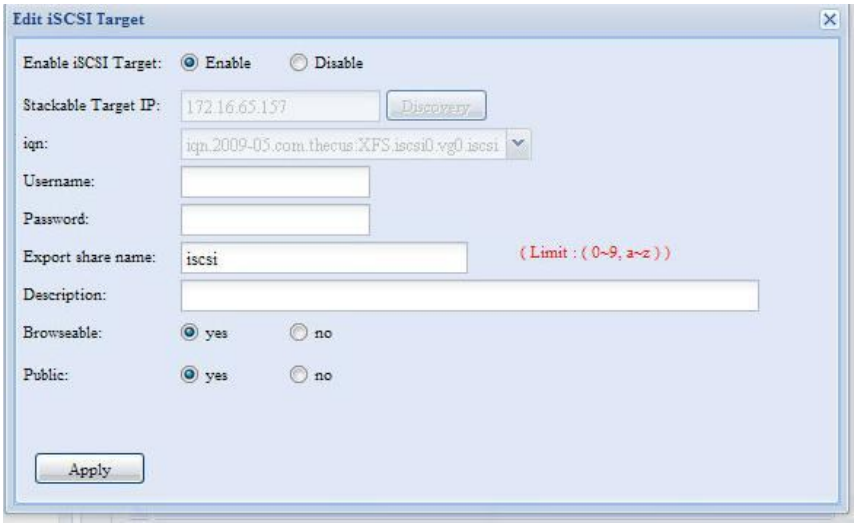


With this newly attached stack target device, you will see the information displayed and also several options you can choose.

In general, if attached stack target device has been used by another N5200PRO/1U4500/N5500/N8800/N8800/N8800 as stack target volume, then the **Format** item will be display and system will recognize it straight away and display its capacity. Otherwise, the **Format** item will be available and the **Capacity** and **Status** items will show as "`N/A`" and "`Unknown file system`" respectively.
Next, click ***Format*** to proceed with formatting.
After the format is complete, the stack target volume will be created successfully. You will see the volume's capacity and status in the **Stack Target List** screen.

C. *Edit a Stack Target*

To make any changes to stack targets, click ***Edit*** for the corresponding stack target, and system will bring up the following dialogue:

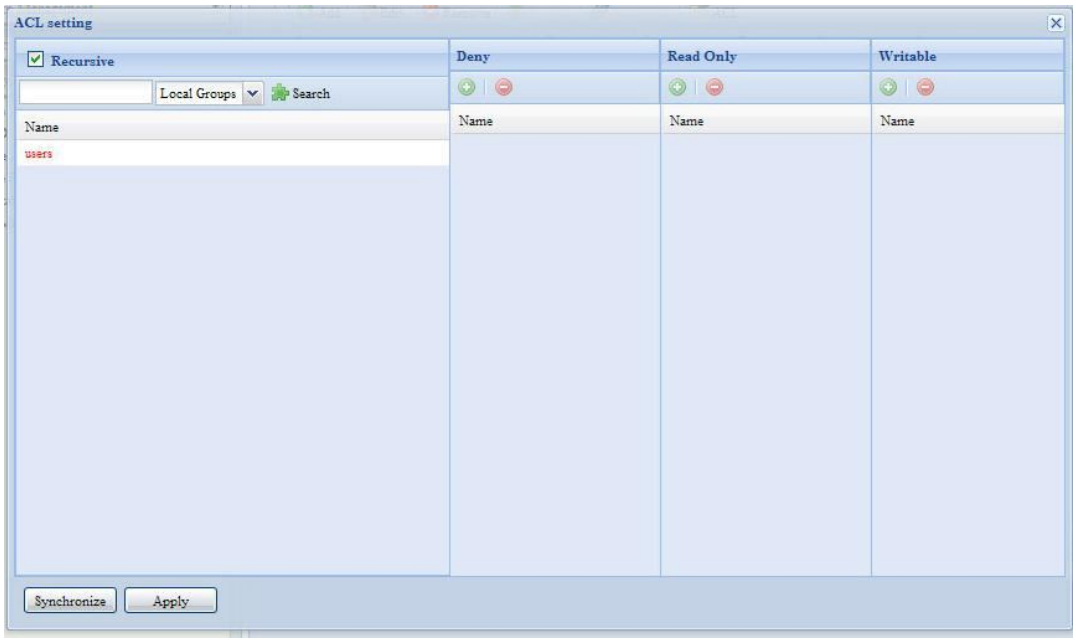


After your changes have been made, click ***Apply*** to confirm any modifications. Once changes are applied, the associated information will be updated on the **Stack Target List** window.

D. *Stack Target ACL*

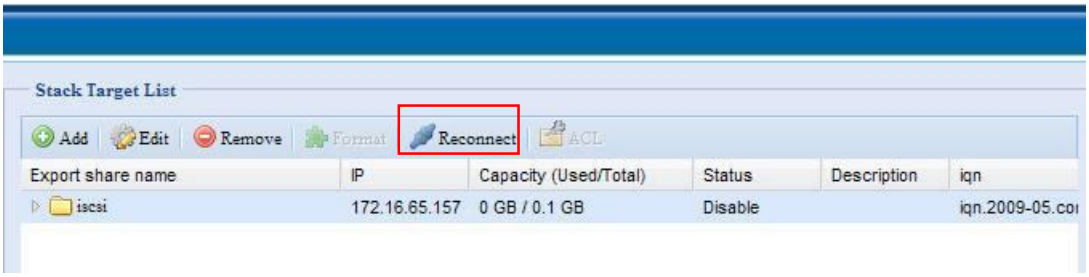
If the stack target **Public** setting set to ***Yes***, then the **ACL** button will be grayed out. However, if **Public** setting is set to ***No***, then the **ACL** button will be available for you to setup user access permissions for the stack target.

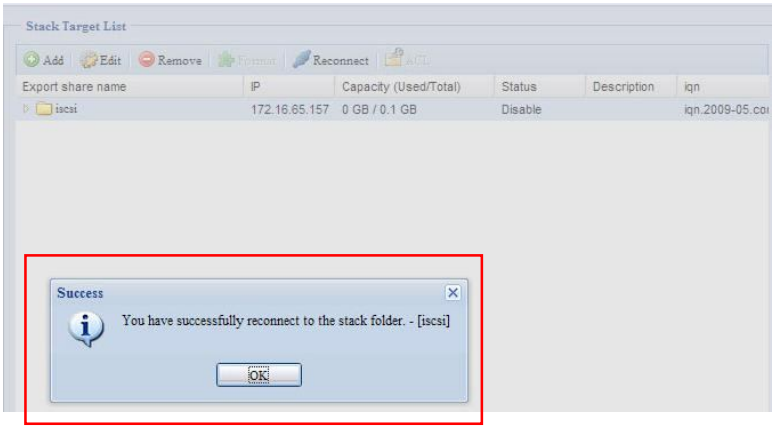
ACL settings will be exactly the same as system folder that you may have setup previously.



E. *Reconnect a Stack Target*

The enabled stack target devices may be disconnected by situations such as power outages or network disconnects. When this happens, the **Reconnect** button will available. To attempt to reconnect the stack target, click ***Reconnect***.



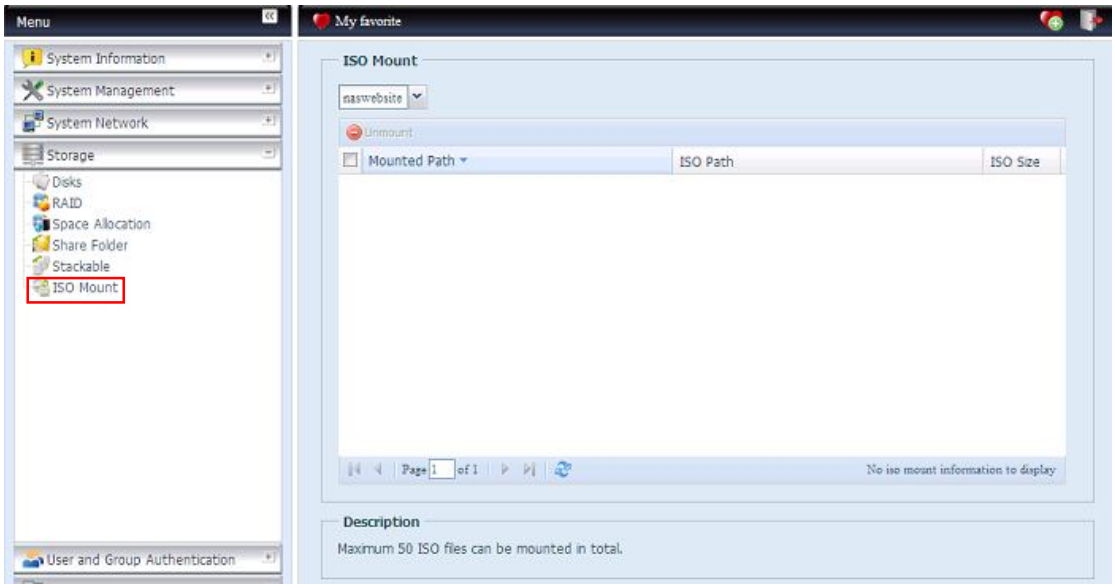


ISO Mount

The ISO Mount feature is very useful tool from Thecus products. With it, users can mount an ISO file and having export name to display all details from mounted ISO file.

From the main menu, the ISO Mount feature is located under "Storage". Please refer the figure below for reference.

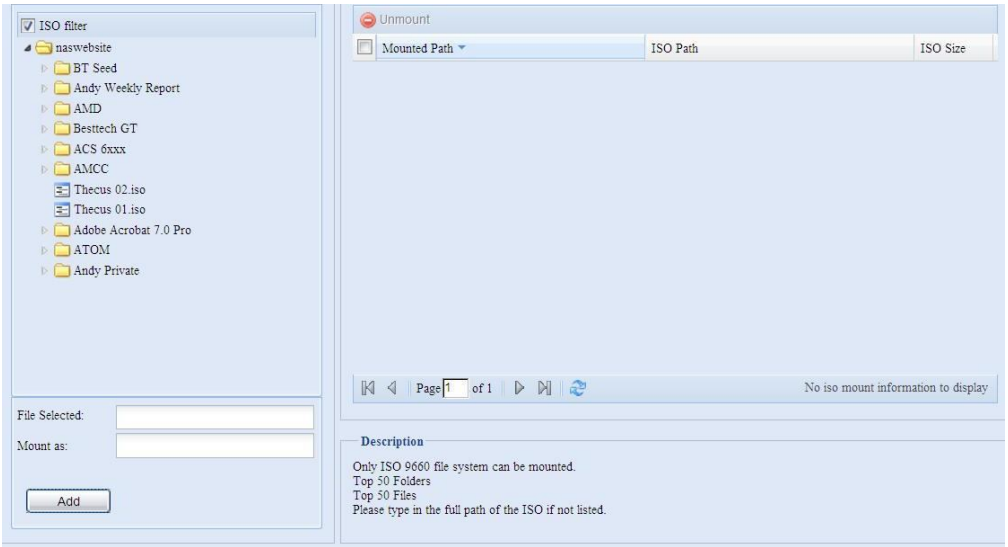
Select on the ISO mount function and you will have the screen shot appear as following.

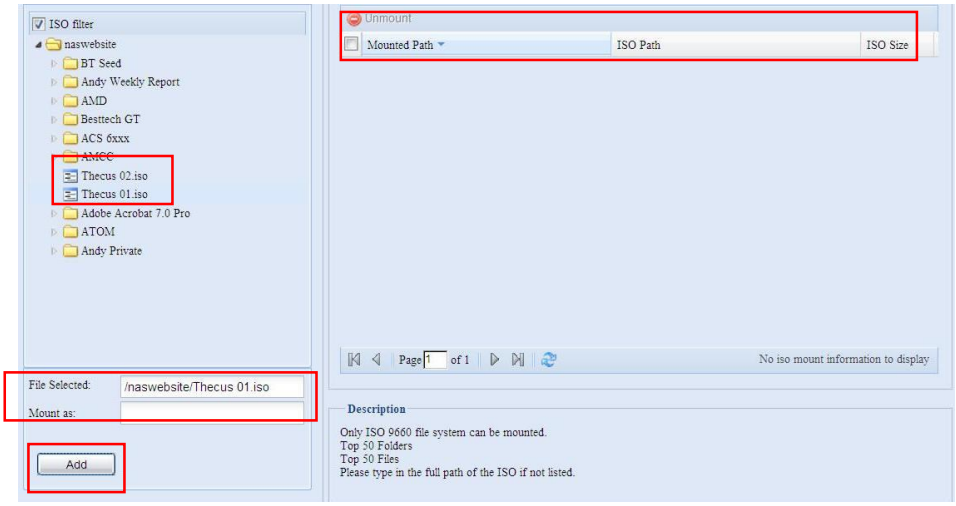


A. *Add a ISO file*

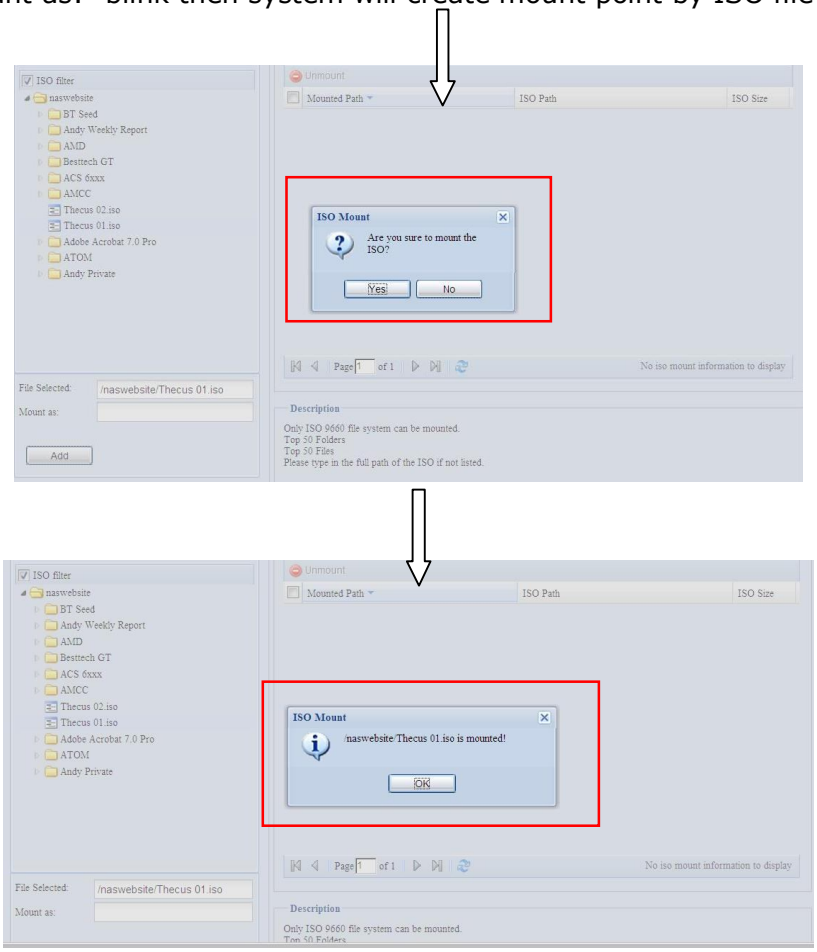
From the figure above, select ISO file from drop down share list.

After selection, system will bring up Mount table for further setting screen.

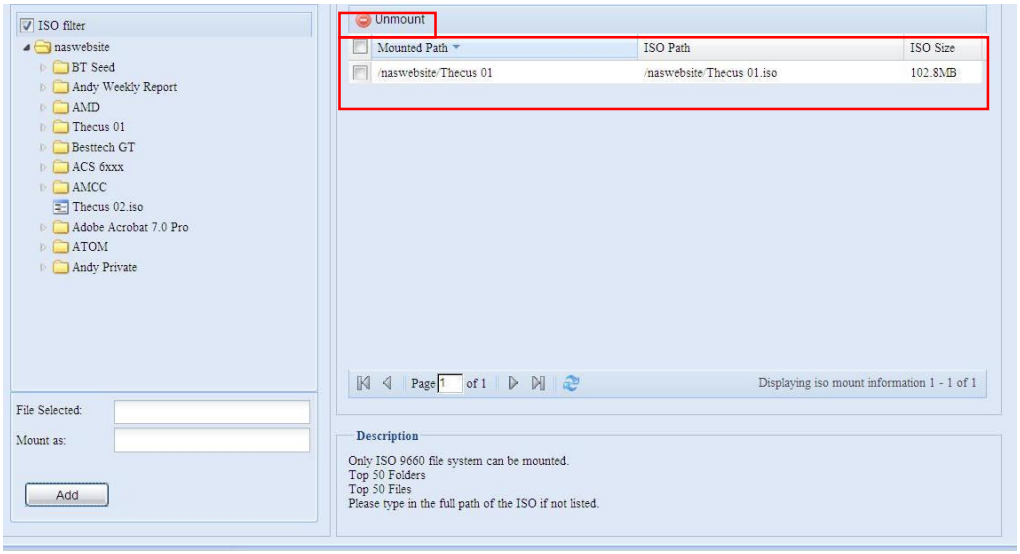




To mount new ISO file, select from listed ISO file and input desired mounting name into "Mount as:" field. Click "ADD" with confirmation to complete mounting ISO file. Or without "Mount as" ISO file export name input, system will automatic to give the export name by ISO file name.
If left "Mount as:" blink then system will create mount point by ISO file name.



After you have completed to add ISO then the page will displayed all mounted ISO files,

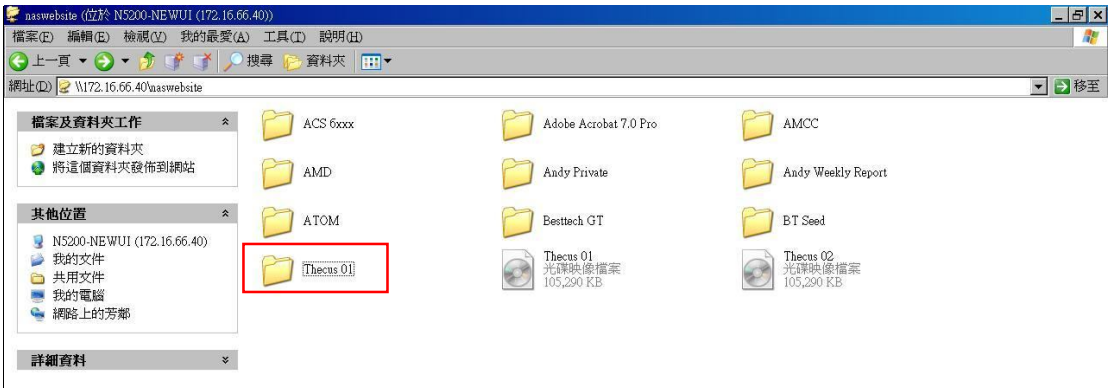


You could click "Unmount" to eliminate mounted ISO file.

B. *Using ISO*

The mounted ISO file will be located same share folder with name giving. Please refer the screen shot below.

ISO file "image" has mounted as folder "Image" you could see. The ISO file "Thecus 01" without assign mounting name, system automatically has folder "Thecus 01" created.

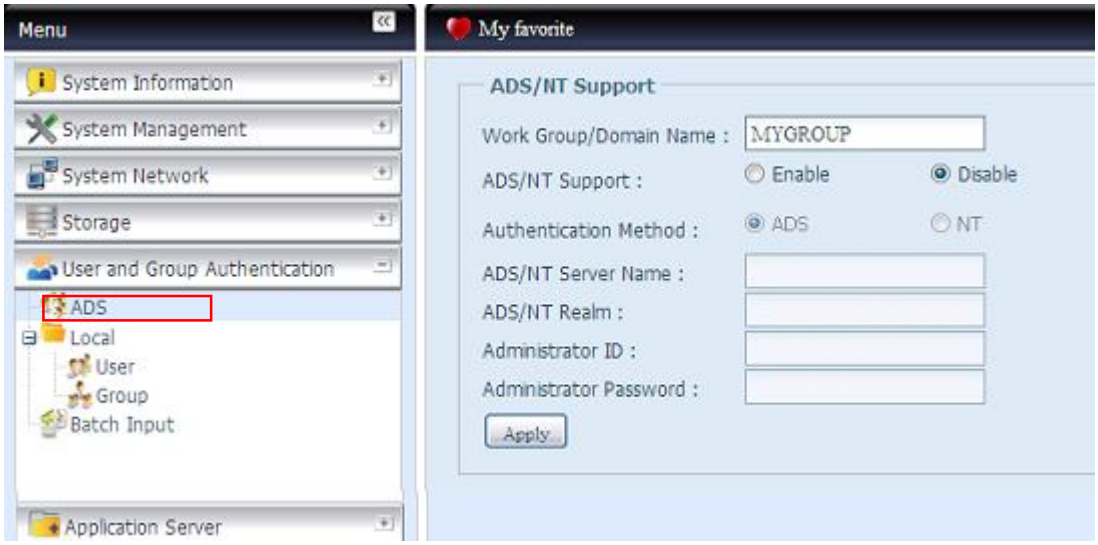


User and Group Authentication

The Thecus IP storage has built-in user database that allows administrators to manage user access using different group policies. From the **User and Group Authentication** menu, you can create, modify, and delete users, and assign them to groups that you designate.

ADS/NT Support

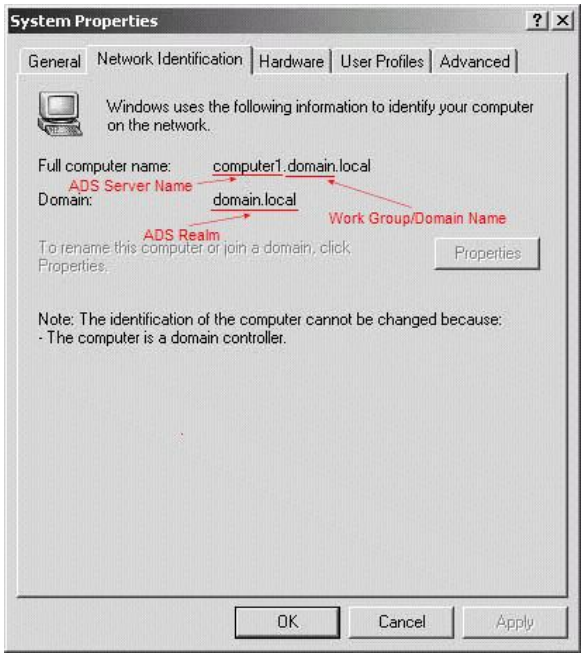
If you have a Windows Active Directory Server (ADS) or Windows NT server to handle the domain security in your network, you can simply enable the ADS/NT support feature; the Thecus IP storage will connect with the ADS/NT server and get all the information of the domain users and groups automatically. From the **Accounts** menu, choose ***Authentication*** item and the **ADS/NT Support** screen appears. You can to change any of these items and press ***Apply*** to confirm your settings.



A description of each item follows:

ADS/NT Support	
Item	**Description**
Work Group / Domain Name	Specifies the SMB/CIFS Work Group / ADS Domain Name (e.g. MYGROUP).
ADS/NT Support	Select Disable to disable authentication through Windows Active Directory Server or Windows NT.
Authentication Method	Select ADS for Windows Active Directory Server, or select NT for Windows NT
ADS/NT Server Name	Specifies the ADS/NT server name (e.g. adservername).
ADS/NT Realm	Specifies the ADS/NT realm (e.g. example.com).
Administrator ID	Enter the administrators ID of Windows Active Directory or Windows NT, which is required for Thecus IP storage to join domain.
Administrator Password	Enter the ADS/NT Administrator password.
Apply	To save your settings.

To join an AD domain, you can refer the figure and use the example below to configure the Thecus IP storage for associated filed input:



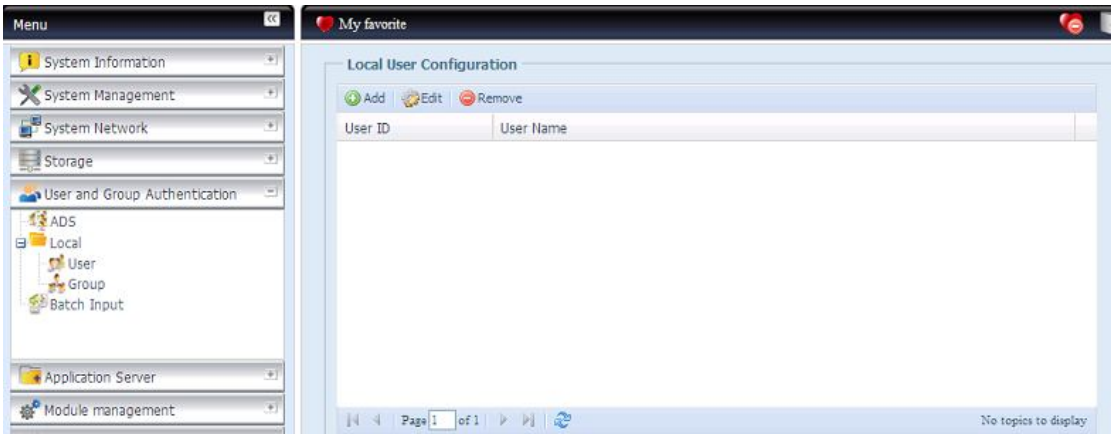
AD Domain Example	
Item	**Information**
Work Group / Domain Name	domain
ADS Support	Enable
ADS Server Name	Computer1
ADS/NT Realm	Domain.local
Administrator ID	Administrator
Administrator Password	**********

NOTE

- The DNS server specified in the WAN/LAN1 configuration page should be able to correctly resolve the ADS server name.
- The time zone setting between Thecus IP storage and ADS should be identical.
- The system time difference between Thecus IP storage and ADS should be less than five minutes.
- The Administrator Password field is for the password of ADS (Active Directory Server) not Thecus IP storage.

Local User Configuration

From the **Accounts** menu, choose the **User** item, and the **Local User Configuration** screen appears. This screen allows you to **Add**, **Edit**, and **Remove** local users.



Local User Configuration	
Item	**Description**
Add	Press the ***Add*** button to add a user to the list of local users.
Edit	Press the ***Edit*** button to modify a local user.
Remove	Press the ***Remove*** button to delete a selected user from the system.

Add Users

1. Click on the ***Add*** button on **Local User Configuration** screen, and **Local User Setting** screen appears.

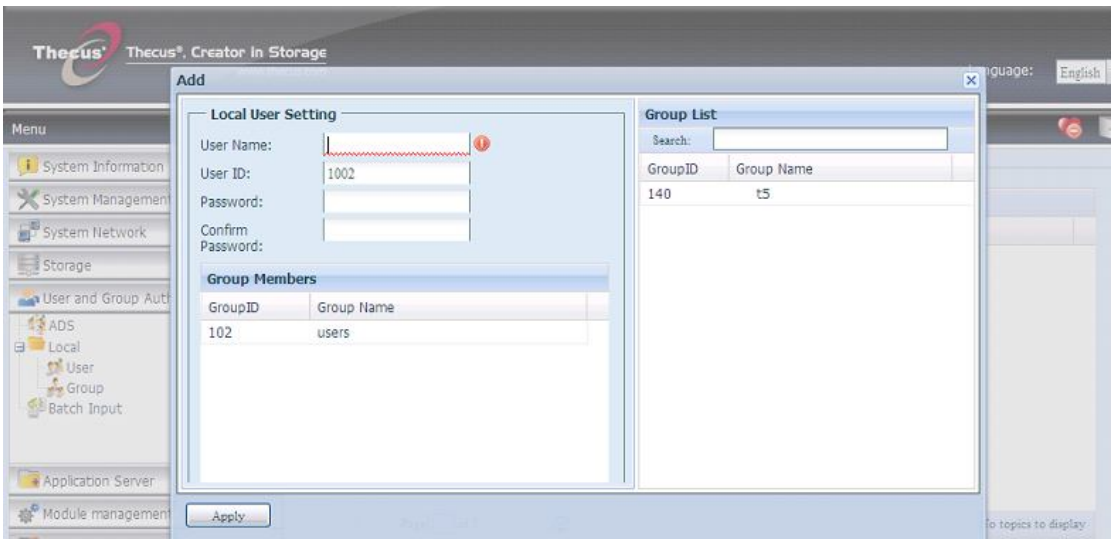
2. On the **Local User Setting** screen, enter a name in the **User Name** box.

3. Enter a **User ID** number. If left blank, the system will automatically assign one.

4. Enter a password in the **Password** box and re-enter the password in the **Confirm** box.

5. Select which group the user will belong to. **Group Members** is a list of groups this user belongs to. **Group List** is a list of groups this user does not belong to. Use the **<<** or **>>** buttons to have this user join or leave a group.

6. Press the ***Apply*** button and the user is created.



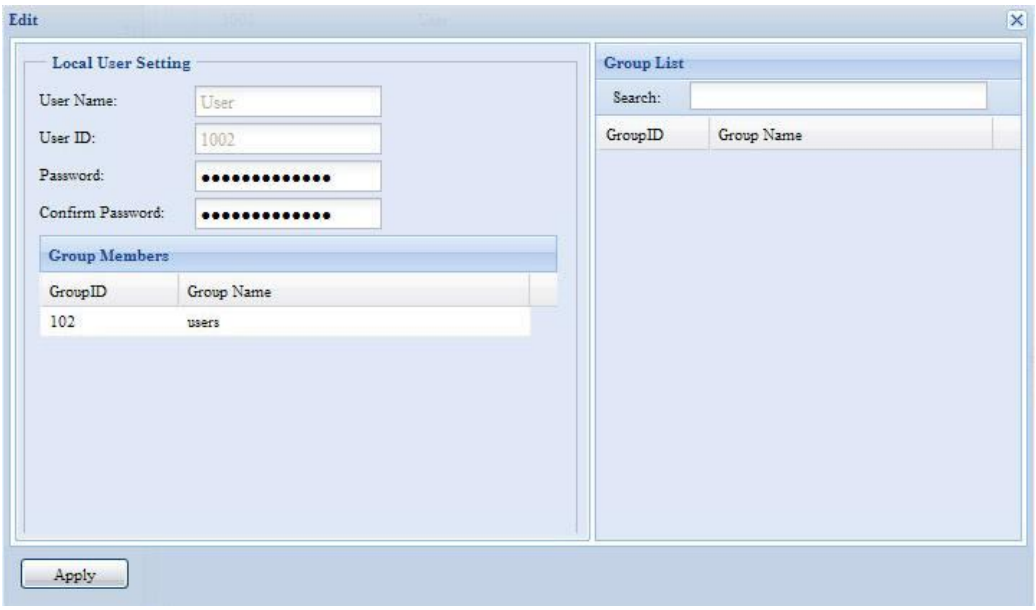
NOTE All users are automatically assigned to the 'users' group.

Edit Users

1. Select an existing user from the **Local User Configuration** screen.

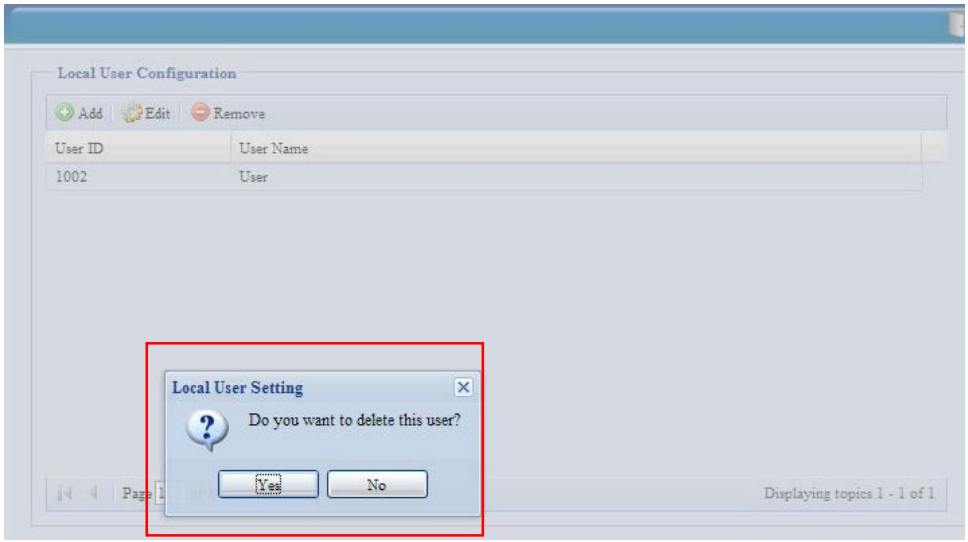
2. Click on the ***Edit*** button, and **Local User Setting** screen appears.

3. From here, you can enter a new password and re-enter to confirm, or use the **<<** or **>>** buttons to have this user join or leave a group. Click the ***Apply*** button to save your changes.



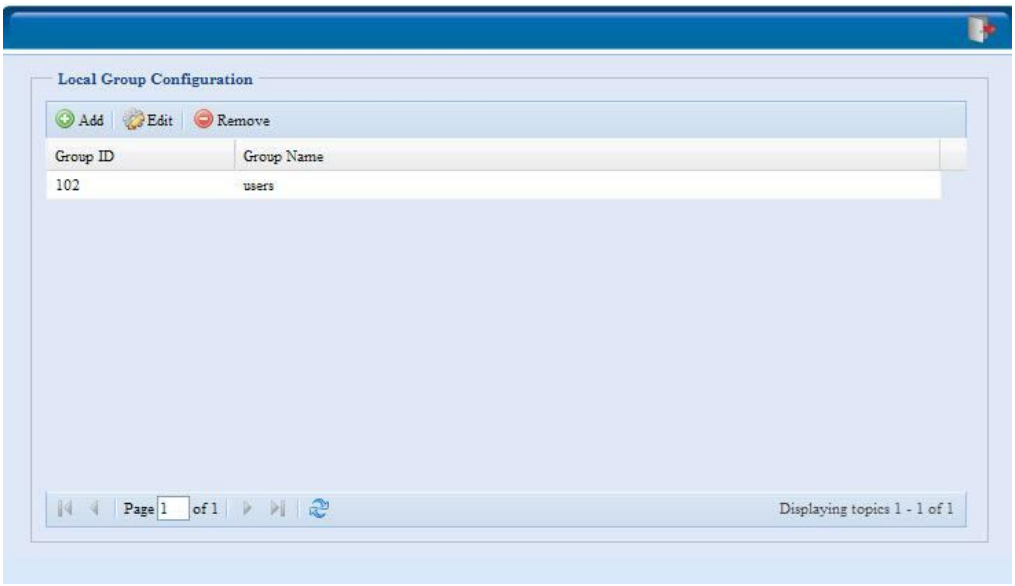
Remove Users

1. Select an existing user from the **Local User Configuration** screen.
2. Click on ***Remove*** button and the user is deleted from the system.



Local Group Configuration

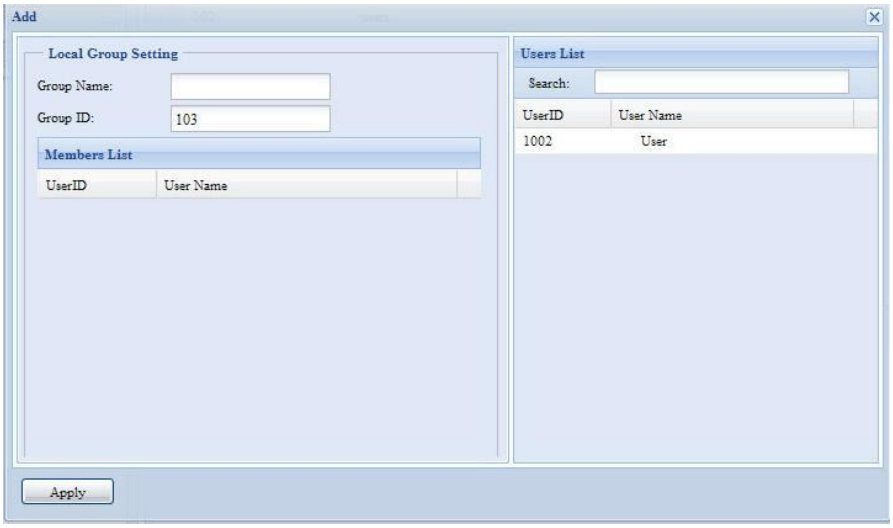
From the **Accounts** menu, choose the ***Group*** item, and the **Local Group Configuration** screen appears. This screen allows you to **Add**, **Edit**, and **Remove** local groups.



Local Group Configuration	
Item	**Description**
Add	Press the ***Add*** button to add a user to the list of local groups.
Edit	Press the ***Edit*** button to modify a selected group from the system.
Remove	Press the **Remove** button to delete a selected group from the system.

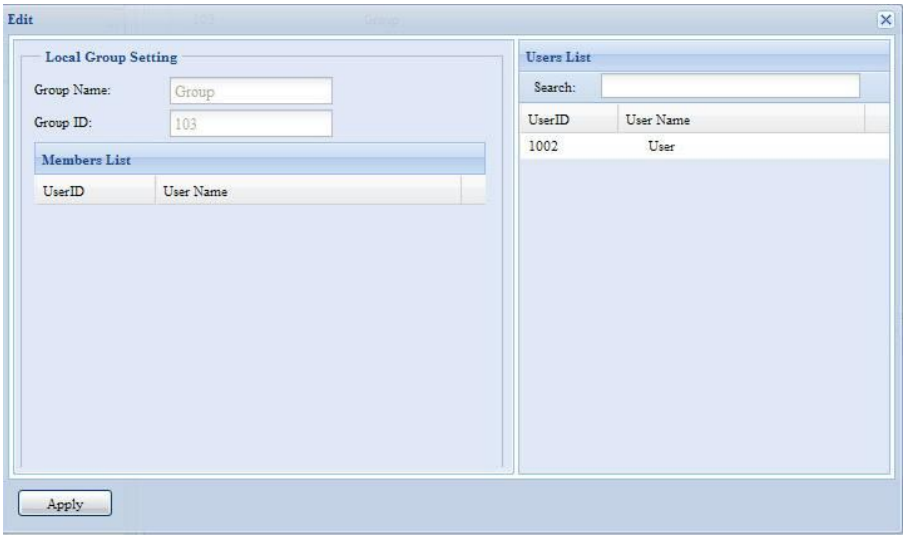
Add Groups

1. On the **Local Group Configuration** screen, click on the ***Add*** button.
2. The **Local Group Setting** screen appears.
3. Enter a **Group Name**.
4. Enter a **Group ID** number. If left blank, the system will automatically assign one.
5. Select users to be in this group from the **Users List** by adding them to the **Members List** using the **<<** button.
6. Click the ***Apply*** button to save your changes.



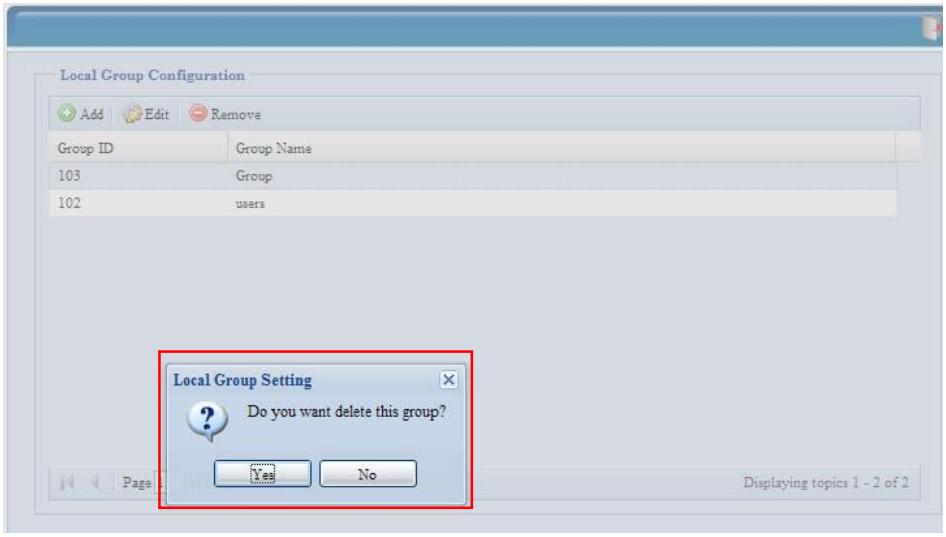
Edit Groups

1. On the **Local Group Configuration** screen, select a group name from the list.
2. Press the ***Edit*** button to modify the members in a group.
3. To add a user into a group, select the user from the **Users List**, and press the **<<** button to move the user into the **Members List**.
4. To remove a user from a group, select the user from **Members List**, and press the **>>** button.
5. Click the ***Apply*** button to save your changes.



Remove Groups

1. On the **Local Group Configuration** screen, select a group name from the list.
2. Press ***Remove*** to delete the group from the system.



Batch Create Users and Groups

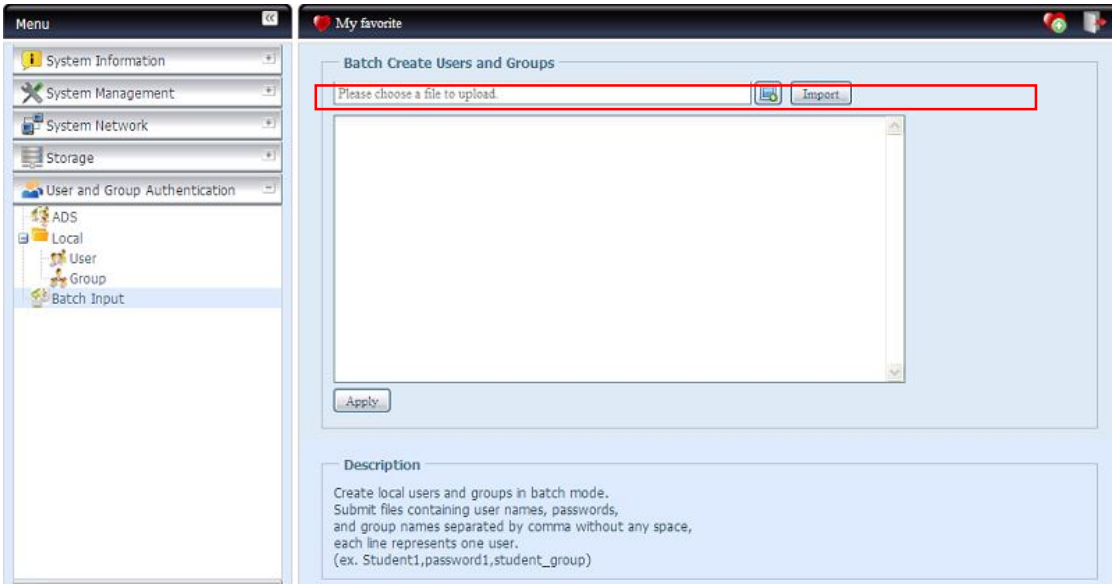
The Thecus IP storage can also add users and groups in batch mode. This enables you to conveniently add numerous users and groups automatically by importing a simple comma-separated plain text (*.txt) file.

From the **Accounts** menu, click ***Batch Mgmt*** and the **Batch Create Users and Groups dialogue** will appear. To import your list of users and groups, follow these steps:

1. Click ***Browse…*** to locate your comma-separated text file.
   The information in the text file should follow this format:

   ```
   [USERNAME], [PASSWORD], [GROUP]
   ```

2. Click ***Open***.
3. Click ***Import*** to begin the user list import.

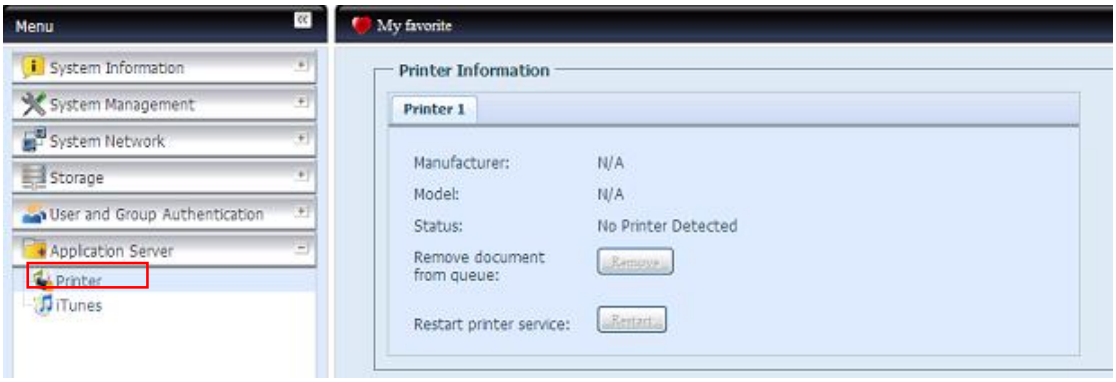


Application Server

The Thecus IP storage supports printer server, and Tunes server. The integrated Print Server allows you to share a single USB printer will all users on the network. The Thecus IP storage provides activating the iTunes Server on the device. You will be able to play music files on this device with your iTunes client software directly. The following section shows you how.

Printer Information

From the **Application Server** menu, choose the ***Printer*** item, and the **Printer Information** screen appears. This screen provides the following information about the USB printer connected to the USB port.



Printer Information	
Item	**Description**
Manufacturer	Displays the name of the USB printer manufacturer.
Model	Displays the model of the USB printer.
Status	Displays the status of the USB printer.
Remove document from Queue	Click to remove all documents from printer queue
Restart Printer service	Click to restart printer service

If a corrupt print job is sent to a printer, printing may suddenly fail. If your print jobs seem to be locked up, pressing the ***Remove All Documents*** button to clear the print queue may resolve the issue.

You can configure Thecus IP storage to act as a printer server. That way, all PCs connected to the network can utilize the same printer.

Windows XP SP2

To set up the Printer Server in Windows XP SP2, follow the steps below:

1. Connect the USB printer to one of the USB ports (preferably the rear USB ports; front USB ports can be used for external HDD enclosures).
2. Go to ***Start*** > ***Printers and Faxes***.
3. Click on **File** > **Add Printer**.
4. The **Add Printer Wizard** appears on your screen. Click ***Next***.
5. Select the "***A network printer, or a printer attached to another computer***" option.
6. Select "***Connect to a printer on the Internet or on a home or office network***", and enter "**`http://Thecus IP storage IP_ADDRESS:631/printers/usb-printer`**" into the URL field.
7. Your Windows system will ask you to install drivers for your printer. Select correct driver for your printer.
8. Your Windows system will ask you if you want to set this printer as "Default Printer". Select ***Yes*** and all your print jobs will be submitted to this printer by default. Click ***Next***.
9. Click ***Finish***.

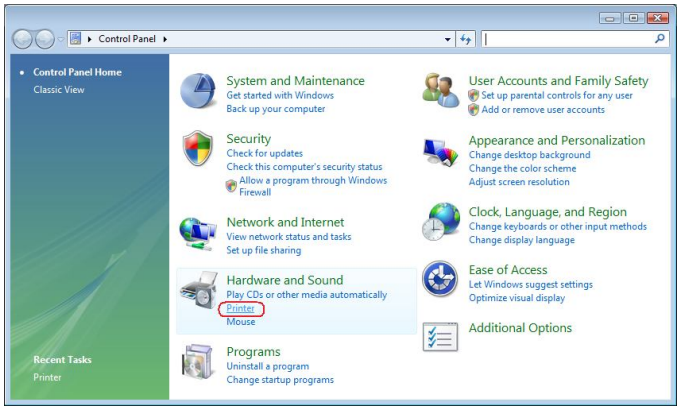
NOTE

- Not all USB printers are supported. Please check Thecus website for a list of supported printers.
- Note that if a multi-function (all-in-one) printer is attached to the Thecus IP Storage, usually only the printing and fax functions will work. Other features, such as scanning, will probably not function.

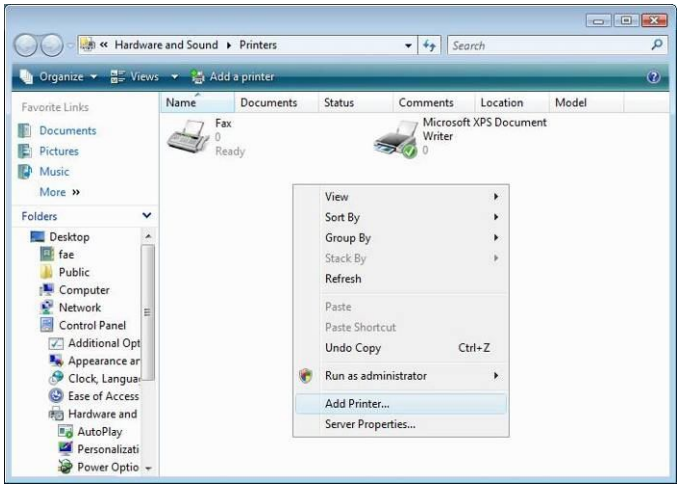
Windows Vista

To set up the Printer Server in Windows Vista, follow the steps below:

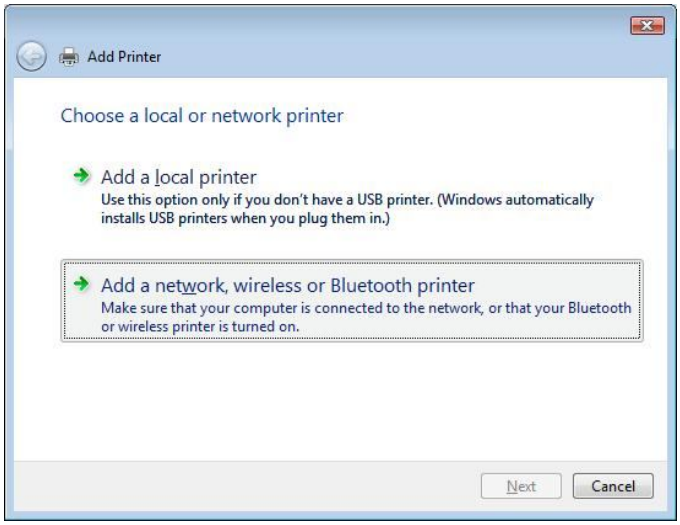
1. Open ***Printer Folder*** from the **Control Panel**.



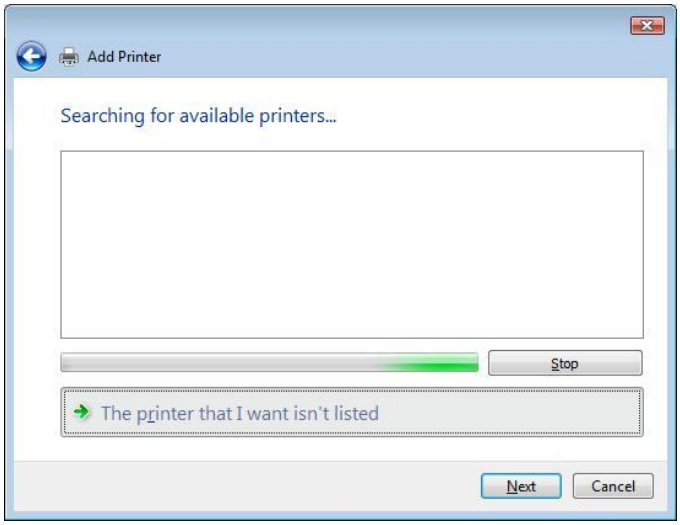
2. Click the right mouse button in anywhere on the **Printers** folder and then select ***Add Printer***.



3. Select ***Add a network, wireless or Bluetooth printer***.

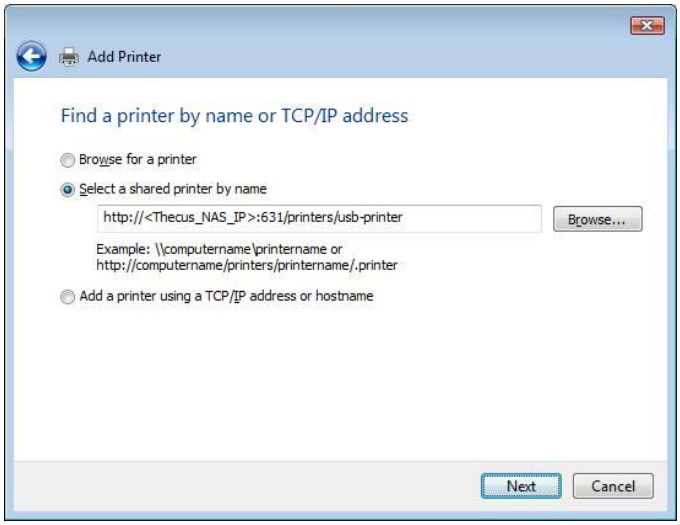

Add Printer
Choose a local or network printer
Add a local printer
Use this option only if you don't have a USB printer. (Windows automatically installs USB printers when you plug them in.)
Add a network, wireless or Bluetooth printer
Make sure that your computer is connected to the network, or that your Bluetooth or wireless printer is turned on.
Next
Cancel

4. Select ***The printer that I want isn't listed***.



You can press ***The printer that I want isn't listed*** to go into next page without waiting for **Searching for available printers** to finish.

5. Click ***Select a shared printer by name***.



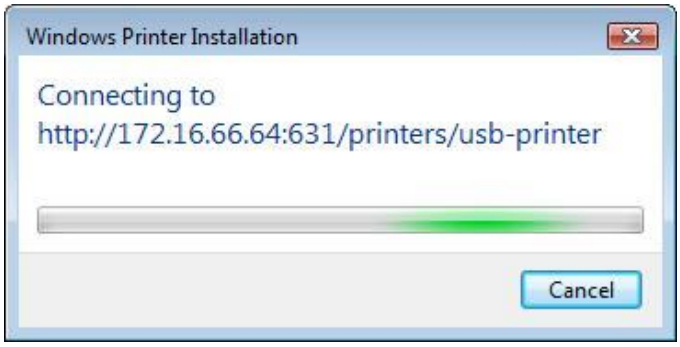
Type `http://<Thecus_NAS>:631/printers/usb-printer` in the box, where `<Thecus_NAS_IP>` is the IP address of Thecus IP storage. Click ***Next***.

6. Select or install a printer and then press ***OK***.

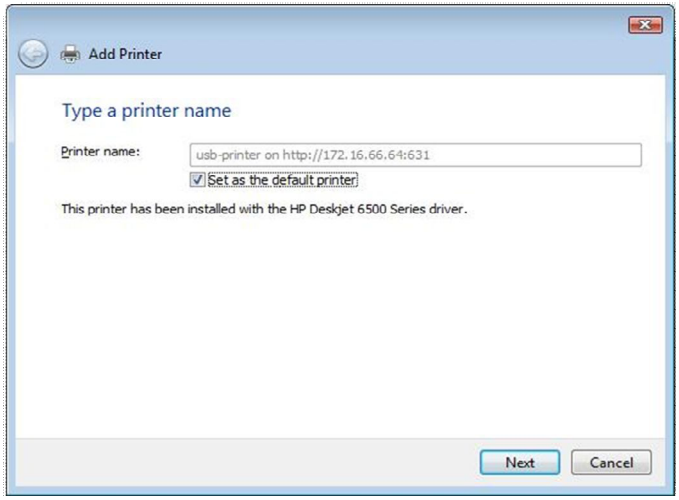
Add Printer Wizard
Select the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.
Manufacturer
HP
IBM
infotec
Konica
KONICA MINOLTA
Printers
HP DeskJet 615C
HP DeskJet 640C/642C/648C
HP Deskjet 6500 Series
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
OK
Cancel

If your printer model is not listed, please contact your printer manufacturer for help.

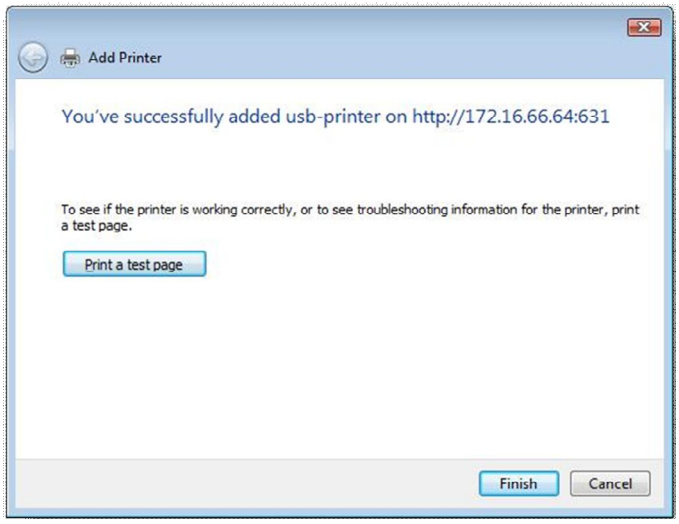
7. Windows will attempt to connect to the printer.



8. You can choose to set this printer as the default printer by checking the ***Set as the default printer*** box. Click ***Next*** to continue.



9. Done! Click ***Finish***.


Add Printer
You've successfully added usb-printer on http://172.16.66.64:631
To see if the printer is working correctly, or to see troubleshooting information for the printer, print a test page.
Print a test page
Finish
Cancel

iTunes® Server

With the built-in iTunes server capability, Thecus IP storage enables digital music to be shared and played anywhere on the network!

From the **Network** menu, choose the ***iTunes*** item, and the **iTunes Configuration** screen appears. You may enable or disable the iTunes Service from here. Once enabled, enter correct information for each field and press ***Apply*** to save your changes.

See the following table for detailed descriptions of each field:

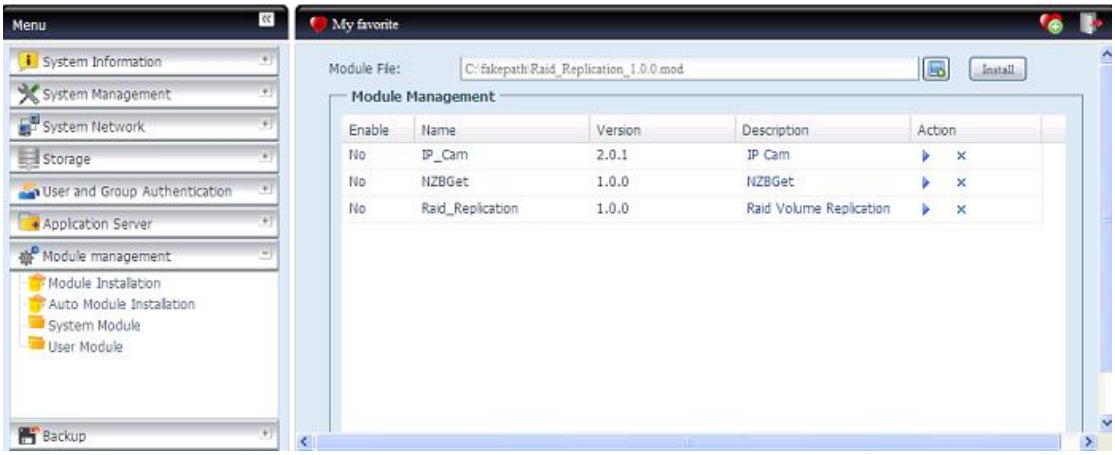
iTunes Configuration	
Item	**Description**
iTunes	Enable or disable the iTunes Service.
Server Name	Name used to identify Thecus IP storage to iTunes clients.
Password	Enter password to control access to your iTunes music.
Rescan Interval	Rescan interval in seconds.
MP3 Tag Encode	Specify tag encoding for MP3 files stored in Thecus IP storage. All ID3 tags will be sent out in UTF-8 format.

Once the iTunes service is enabled, Thecus IP storage will make all music located in the **Music** folder available for iTunes-equipped computers on the network.

Module Management

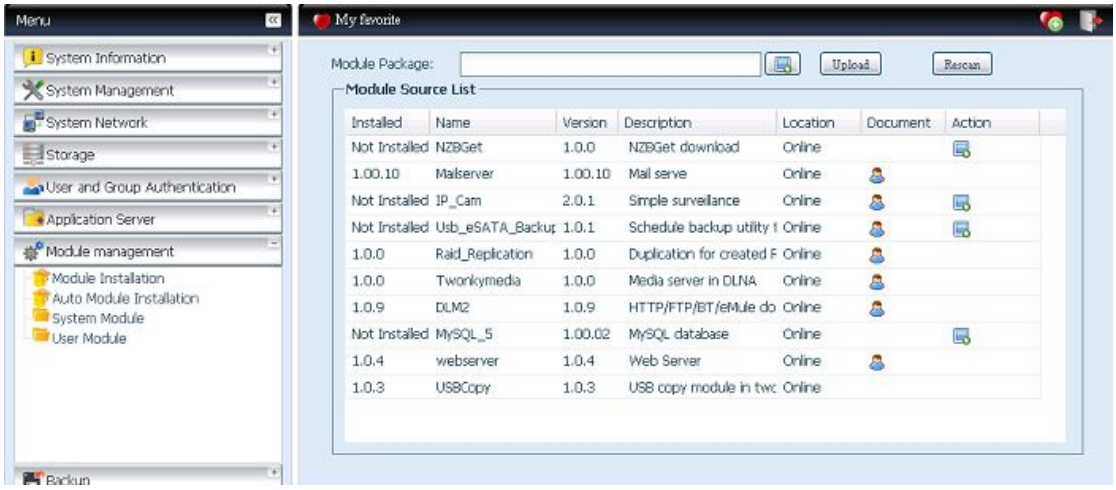
Module Installation

From the **Module Management** menu, choose the ***Module Installation*** item and the **Module Management** screen appears. From here, you can install separate software modules to extend the functionality of your Thecus IP storage.



Auto Module Installation

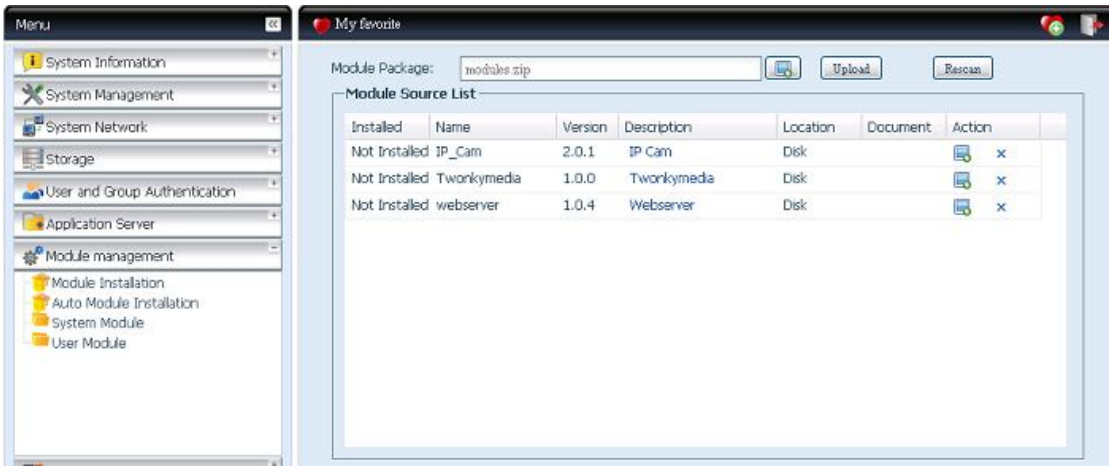
Or choose the ***Auto Module Installation*** item and the **available system Module** screen appears. The default to get module list is "On-line" so if Thecus IP storage is capable to connect to Internet then it will automatically link to Thecus official website then list available modules. Please refer the screen shot below.



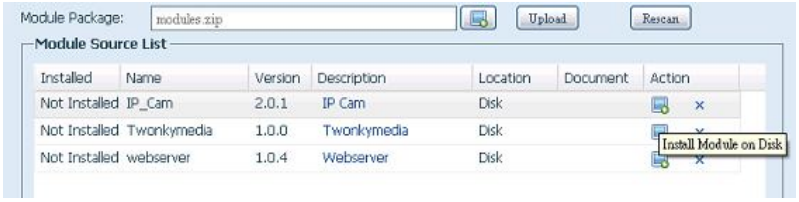
The other way to have auto module installed is using universal CD shipped with system. It has contained file "modules.zip" which included all modules while system shipped. Please refer the screenshot below.

NOTE

The modules list getting on-line of Thecus website will newly than "thecus.zip" from shipped CD. But the installation from Thecus website could have unpredictable duration due to bandwidth concern.



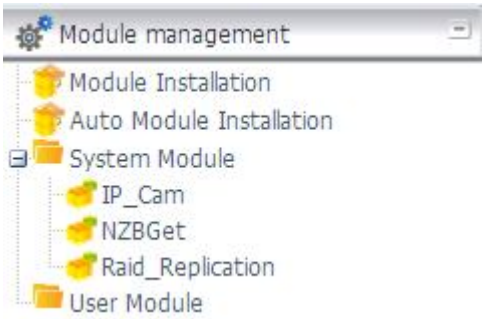
Auto Module Source List	
Item	**Description**
Installed	Status of module
Name	Module name
Version	The version of released version
Description	The description of module
Location	The module is either getting on-line or disk
Document	The available documentation of module
Action	To install module or deleted p.s. If module list from on-line, then no delete option available
Rescan	Click to rescan from both on-line and disk



After click on "Action" to install module, the module will be under list of Module Installation. Please do "Enable" to activate module usage.

System Module

The system module is officially provided by Thecus for new features added. The module will list once it has been enabled from "Module Installation".



User Module

The user module is reserved for Thecus fans to build up 3rd party functions in the future.

Backup

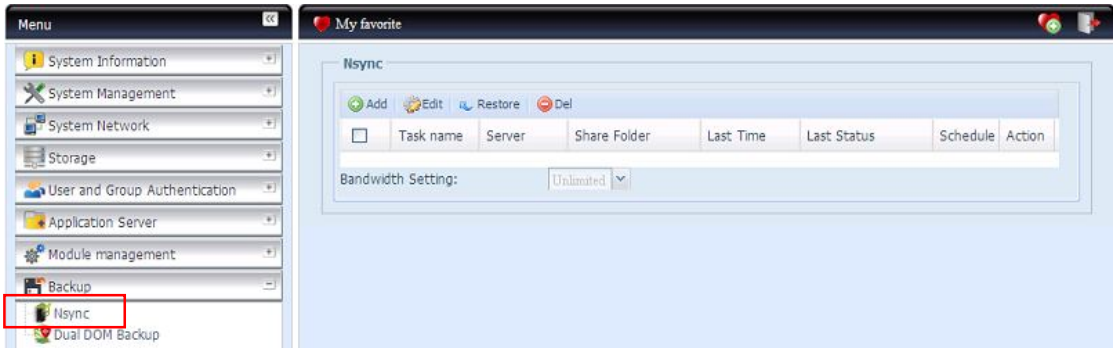
There are a number of ways to back up data with the Thecus IP storage.

Nsync

You can backup a share folder to another Thecus IP storage (Nsync Target) or any FTP server for safe keeping as long as you have appropriate access right on that target.

If the files on your Thecus IP storage are lost for any reason, you can restore those files from the target Thecus IP storage. To backup files regularly, you can set up a scheduled task to run only once, daily, weekly, or monthly. You can also limit the bandwidth of your Nsync tasks, so other users on the network can share the bandwidth equally.

Under the **Backup** menu, click ***Nsync*** and the **Nsync** window appears.

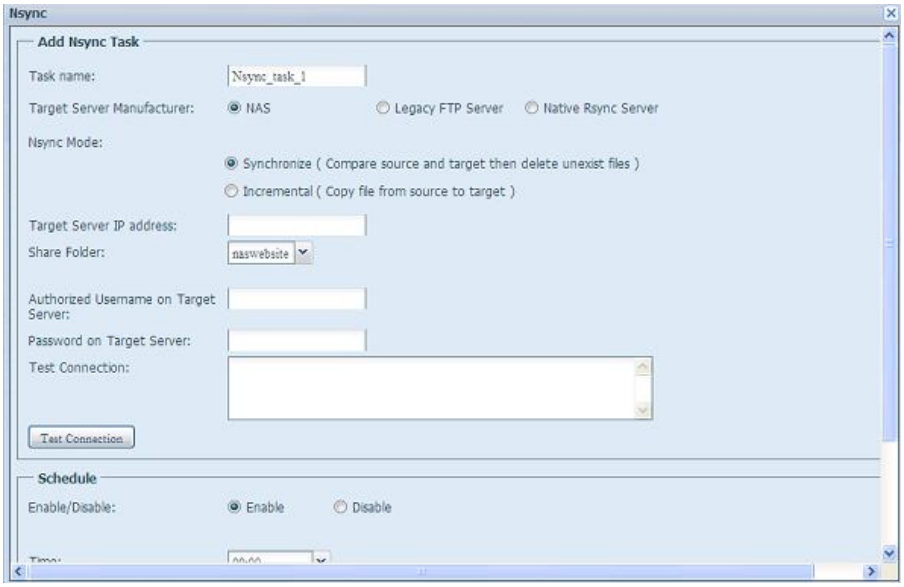


Below is a description of each field:

Nsync	
Item	**Description**
Add	Click to add a Nsync task
Edit	Click to Edit an Nsync task.
Restore	Restore share folder from an Nsync target.
Del	Click to delete an Nsync task. Backup files on Nsync target is also deleted.
Task name	The name of your Nsync task.
Server	The IP address of your target server
Share folder	The share folder you would want to backup.
Last Time	The time when the last Nsync task was executed.
Last Status	The status of your last Nsync task.
Schedule	Schedule backup of your share folders.
Action	Administrator can run or stop an Nsync task by pressing the action button.
Bandwidth Setting	Bandwidth control on Nsync tasks.

Add Nsync Task

From the **Nsync** screen, click ***Add*** to display the **Add Nsync Task** screen.



Add Nsync Task	
Item	**Description**
Task Name	The name of your Nsync task.
Target Server Manufacturer	Select replication to method, it has 3 options can choose from. NAS: To other Thecus IP storage with security tunnel build up. Legacy FTP: To the 3rd party FTP server or Thecus IP storage while it has acted as FTP server. Native Rsync Server: Using rsync to replicate data to other Thecus IP storage
Nsync Mode	Synchronize mode or Incremental mode .
Target Server IP Address	The IP address of your target server.
Source Folder	The share folder you want to backup.
Authorized Username on Target Server	The account name on the target server.
Password on Target Server	The password for the username on the target server.
Test Connection	Click to check the connection to the Target Server.
Schedule	Enable or Disable schedule backup of your share folders.
Time	The time when the Nsync task will run.
Type	Select whether to run the Nsync task daily, weekly, or monthly. **Daily**: input the time of day to execute Nsync task. **Weekly**: input which day of the week to execute the task. **Monthly**: decide which day of the month to execute the task.
Add	Press **Add** to submit your settings.

NOTE Before starting an Nsync Task, make sure the target server's Nsync Server (or FTP Server) is enabled.

NOTE Using "Native Rsync Server" to backup data to other Thecus NAS devices needs to enable target server and setup a valid username and password to grant access permission.

Setting up an Nsync Target on an Thecus IP storage Nsync Device

On the Nsync target server, the administrator of that server has to set up a user account with a folder named "nsync" and grant write access.

1. On the Nsync server, add a user for Nsync source (ex. nsyncsource1). For instructions on how to add a user on the Thecus IP storage, see **Chapter 4: User and Groups Authentication> Local User Configuration > Add Users**.

2. On the Nsync server, grant that user (ex. nsyncsource1) write access to the **nsync** folder. For instructions on how to set up a folder's ACL, see **Chapter 4: Storage management> Shore Folder> Folder Access Control List (ACL)**.

3. Once this is done, the target server will start accepting Nsync tasks from server using that ID and password.

Setting Up an Nsync Target on another Device other than Thecus IP storage

If you selected "Legacy FTP Server" when setting up your Nsync task, the Thecus IP storage will use the FTP protocol to back up the share folder. On the external storage device, make sure there is a folder named "nsync", and the Auth ID has writable permission in that folder.

Designating Thecus IP storage as an Nsync Target

The Thecus IP storage can act as an Nsync server, enabling another Nsync-equipped Thecus NAS at a remote location backup their files to this Thecus IP storage. From the **System Network** menu, choose the ***Nsync Target*** item, and the **Nsync Target Server** screen appears.

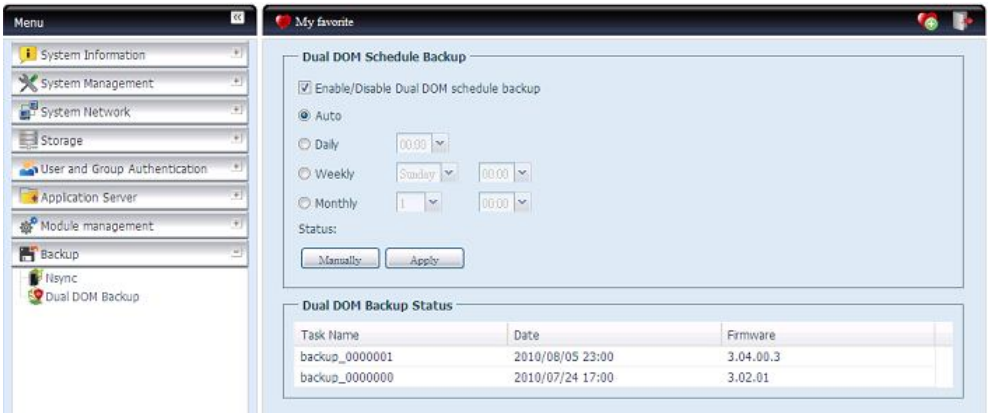
Nsync Target Server Setting	
Item	**Description**
Nsync Target Server	Enable or Disable Nsync Target support.

NOTE To enable Nsync task to go thru firewall, you have to open port TCP/1194 on your firewall in both directions.

Dual DOM (except N0503/N4200Eco/N7700/N8800)

The unique Dual DOM feature can now perform "Auto Repair". The Thecus NAS will backup up to five versions of the system configuration either by the default timing of 1:00am every day automatically or as scheduled by the user.

This unique "Auto Repair" will be triggered if the primary DOM has a booting issue. In this instance, the 2nd DOM will take over the boot function. Then, the system will automatically load the most recent system configuration backup image to repair the primary DOM.


Menu
System Information
System Management
System Network
Storage
User and Group Authentication
Application Server
Module management
Backup
Nsync
Dual DOM Backup
My favorite
Dual DOM Schedule Backup
Enable/Disable Dual DOM schedule backup
Auto
Daily
Weekly
Monthly
Status:
Manually
Apply
Dual DOM Backup Status
Task Name
Date
Firmware
backup_0000001
2010/08/05 23:00
3.04.00.3
backup_0000000
2010/07/24 17:00
3.02.01

Thecus Backup Utility

The Thecus Backup Utility is on your Installation CD. When you click on the CD, the Backup Utility will be installed under **Program Groups** > **Thecus** > **Thecus Backup Utility**. If it is not installed, you can copy the file (**Thecus Backup Utility.exe**) to a convenient location on your hard disk and double click to execute it.

NOTE

If you can not find Thecus Backup Utility on your CD, please download it from the Thecus website (http://www.thecus.com).

When you execute this utility for the first time, it will ask you whether to create a DB file. Click ***Yes***.

1. Click ***Add*** to create a Backup task. The **Add New Task** dialog box appears.

Add New Task	
Item	**Description**
Task	Specifies a name for the current task.
Source	Click to specify the source folder/file location.
Incremental	Click to specify whether the backup will be incremental. If unchecked, the backup will be a full backup.
Destination	Click to specify the destination folder/file location.
Excluded extensions	Files with these file name extensions will be skipped and not back up to the destination.
Comments	If you wish, enter comments here for your records.

2. To schedule the task to run at regular intervals, click on the ***Schedule*** icon for that task. You can schedule the task to run **Monthly** or **Weekly**.

3. To check the log for that task, click on the ***Log*** icon for that task.

NOTE

Thecus Backup Utility also supports MAC OS X. Just copy the Thecus Backup Utility.dmg to your MAC OS X machine and double click to execute it.

Windows XP Data Backup

If you use Windows XP Professional, you can also use the Windows Backup Utility (Ntbackup.exe) to backup your files.

If you use Windows XP Home Edition, follow these steps to install the utility:

1. Insert the Windows XP CD into a drive and double-click the ***CD*** icon in **My Computer**.

2. When the Welcome to Microsoft Windows XP screen appears, click ***Perform Additional Tasks***.

3. Click ***Browse this CD***.

4. In Windows Explorer, navigate to ***ValueAdd*** > ***Msft*** > ***Ntbackup***.

5. Double-click ***Ntbackup.msi*** to install the backup utility.

Once installed, you can use the Windows Backup Utility by following the steps below:

1. Click ***Start***, and point to ***All Programs*** > ***Accessories*** > ***System Tools*** > ***Backup*** to start the wizard.

2. Click ***Next*** to skip past the opening page. Choose **Backup files and settings** from the second page, and then click ***Next***.

3. Select which option you want to back up.

4. Click ***Next*** and in the Backup Type, Destination, and Name page, specify a back up location using the ***Browse*** button.

5. Find and select the drive that specifies your Thecus IP storage as your backup destination and click ***Next***.

6. Click ***Next*** to display the wizard's final page and click ***Finish*** to start backing up.

Apple OS X Backup Utilities

Mac OS X does not include any backup software. However, there are a number of backup solutions available for the Mac OS X, including: iBackup, Psyncx, iMSafe, Rsyncx, Folder Synchronizer X, Tri-BACKUP, Impression, Intego Personal Backup, SilverKeeper, and Apple's dotMac Backup utility to name just a few. To find even more freeware and shareware backup utilities to choose from, go to VersionTracker or MacUpdate and search on "backup".

Chapter 5: Using Thecus IP Storage

Overview

Once the Thecus IP storage is setup and operating, users on the network may manage all varieties of digital music, photos, or files by simply using their web browsers. To manage your personal files or access public files on the Thecus IP storage, just enter its IP address into your browser (default IP address is `http://192.168.1.100`), and you will be taken to the **Thecus IP storage Login** page.

NOTE

Before proceeding, make sure that WebDisk Support or Secure WebDisk Support is enabled in the Service Support screen in the system's **Network** menu. See Service Support in Chapter 4: System Network >HTTP/Web Disk.

Login Page

To login to the system, enter your user name and password, and select Web Disk or Photo server then click ***Login*** to log into the system. You will be taken to the **selected** interface.

Using WebDisk

The Thecus IP storage provides a WebDisk function that allows you to access the system over the Internet from any browser.

1. In the Login page, type in the User ID and password that were previously set for you in the Accounts menu. See **Chapter 4:User and Group Authentication > Local User Configuration**.

2. The WebDisk page appears showing folders made currently available to you via the **Access Control List (ACL)**.

3. Click on a folder name to enter the folder.

4. The folder's page appears displaying files and folders. Click on a file to download the file.

5. Buttons on the folder page allow you to create a new folder, upload files and delete files in the folder.

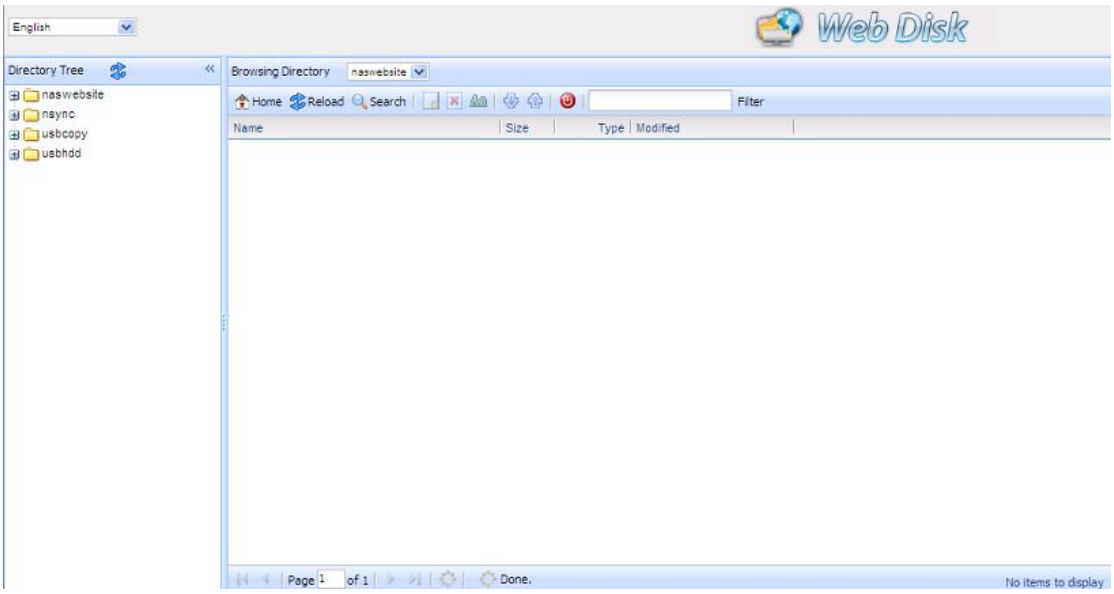
6. To create a new folder within the current folder, press the New folder button. When the screen appears enter a name for the folder. Press OK to create the folder.

7. To upload a file from your computer to the current folder, press the New file (upload) button. When the screen appears, press Browse and locate the file to upload. Press **OK** and the file is uploaded to the current folder.

8. To delete a file or folder, select the file or folder's check box. Press the Delete selected items button. You can also check the check box as the red circle indicates to select all files and folders in this folder.

To access folders with access control, you must first login with a local user account.

For more information on how to setup user rights to the folders, please check ***Chapter 4: Storage Management >Share Folder > Folder Access Control List (ACL).***



Folder Page Button	
Button	**Description**
Directory Tree	List all directory trees per login user's privilege.
Browsing Directory	Browsing selected directory of its folders and files.
Home	Go back to the web disk directory layer.
Reload	Re-load the current list.
Search	Search files in the current web disk directory. (Must input the complete file name.)
(new file/Directory)	Creates a new folder or directory.

(delete)	Deletes selected files or folders.
(Rename)	Rename a directory or file.
(download)	Download a file to current folder of your computer.
(upload)	Upload file from your computer to current web disk folder.
(Admin)	Change password and confirm new password.
(logout)	To logout of the web disk interface.
Show Directories	Show the files and folders in the directory.
Filter	Search files in the directory. (You can only input some word string.)
Name	Displays the names of folders and files.
Size	Shows the size of folders and files.
Type	Displays the type of folders and files.
Modified	Shows the time of most recent modification of folders and files.
owner	Owner of the file.

There is also the way by using right click button to bring up contact windows as short cut to operate what you needed.

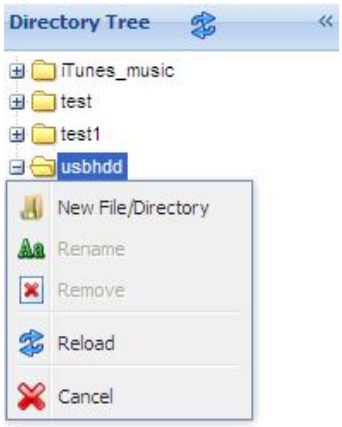
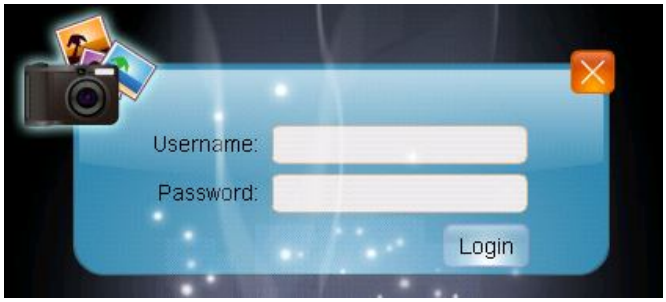


Photo Server

Using the Photo Server, users can view and share photos, and even create their own albums right on the Thecus IP storage.

You will see your own Photo Gallery and all public Photo Albums on the network.

To manage any picture files, you must first select the item by clicking the box then enter user name and password to login photo server.

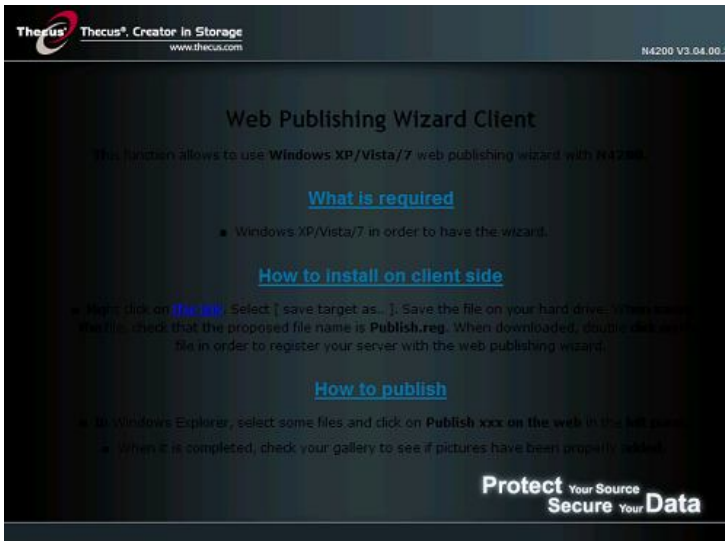


Windows XP Publishing Wizard

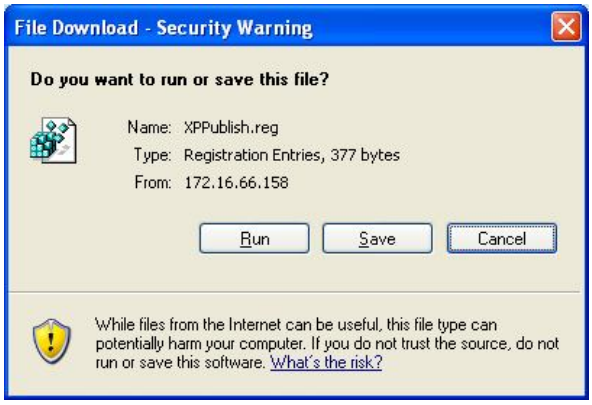
There are many ways for a local user to upload pictures into their photo album. Users of Windows XP can upload their pictures using the Windows XP Publishing Wizard.

1. Click on the ***XP Publishing Wizard*** icon on top right corner.

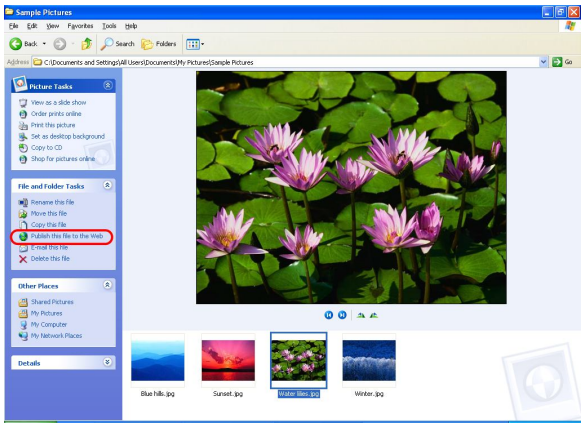
2. The **XP Web Publishing Wizard Client** screen appears. Click on the link to install the Publishing Wizard.



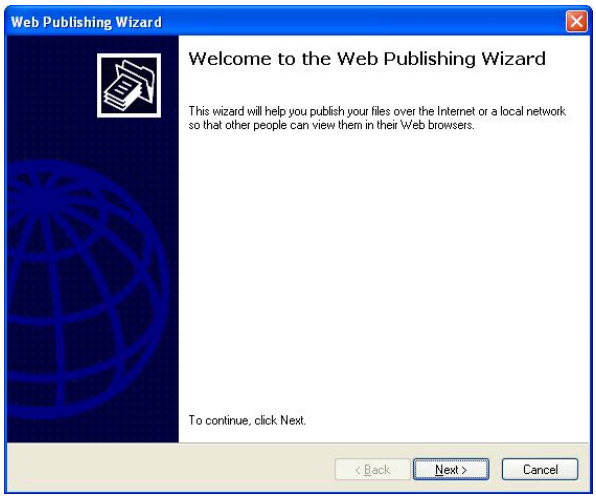
3. Windows XP will ask whether you want to run or save this file. Click **Save** to save the register file.


File Download - Security Warning
Do you want to run or save this file?
Name: XPPublish.reg
Type: Registration Entries, 377 bytes
From: 172.16.66.158
Run
Save
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. What's the risk?

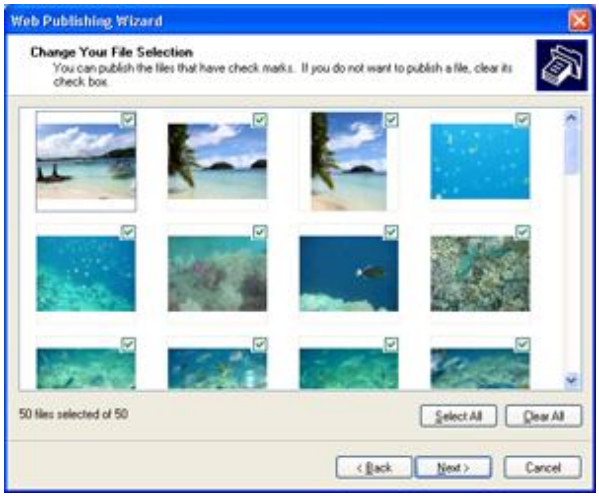
4. Once the register file is installed, use the Windows file manager to browse the folder that contains the picture you want to publish. On the left pane, there will be an icon labeled "**Publish this folder to the Web**".



5. Click on this icon and **Web Publishing Wizard** will start.

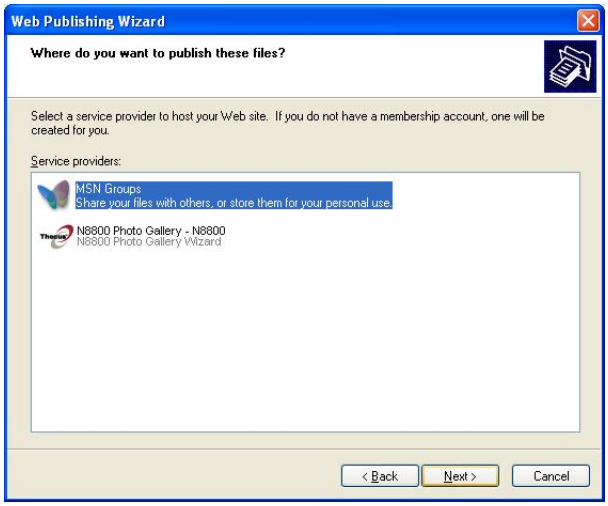

Web Publishing Wizard
Welcome to the Web Publishing Wizard
This wizard will help you publish your files over the Internet or a local network so that other people can view them in their Web browsers.
To continue, click Next.
< Back
Next >
Cancel

6. Select the pictures you want to publish to the Photo Web Server by placing a check mark on the top left hand corner of the picture. Click ***Next***.


Web Publishing Wizard
Change Your File Selection
You can publish the files that have check marks. If you do not want to publish a file, clear its check box.
50 files selected of 50
Select All
Clear All
< Back
Next >
Cancel

7. Your PC will start to connect to the Photo Web Server.

8. Select **Thecus IP storage Photo Gallery Wizard** to publish your pictures to Thecus IP storage.

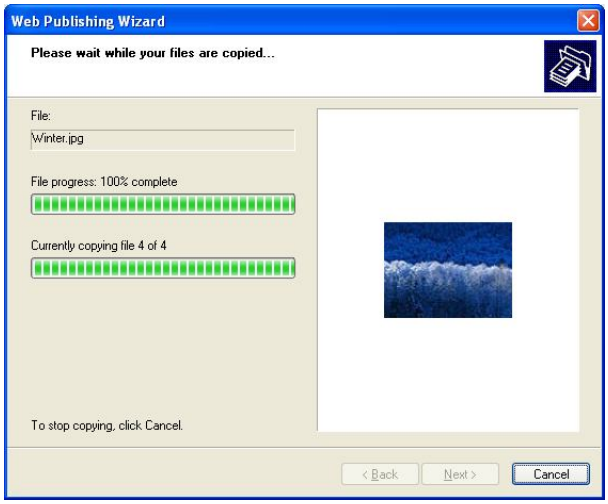

Web Publishing Wizard
Where do you want to publish these files?
Select a service provider to host your Web site. If you do not have a membership account, one will be created for you.
Service providers:
MSN Groups
Share your files with others, or store them for your personal use.
N8800 Photo Gallery - N8800
N8800 Photo Gallery Wizard
< Back
Next >
Cancel

9. Login into Thecus IP storage with your local user name and password.

10. Create your album by entering an album name and clicking on the **Create Album** button.

11. Select the album you want to upload your pictures to.
12. Confirm the target album.

13. Windows will show you that the picture upload is in progress.



14. When the upload is finished, the Wizard will ask you whether if you want to go to the website. Click ***Finish*** to go to your Photo Web Server.

Web Publishing Wizard
Completing the Web Publishing Wizard
You have successfully published your files to this site:
N5500 Photo Gallery
Open this site when I click Finish.
To close this wizard, click Finish.
< Back
Finish
Cancel

15. Click on the user's icon to go to that user's album.

16. You will see the user's album list. Click on **Album**.

17. Finished! You will see the pictures just selected in the album.

Managing Albums and Photos

Icon	Function	Description
	Make Cover	Make selected photo your cover picture.
	Back	Return to the previous screen.

	Add	Add a new album or photos.
	Modify	Edit the name and description of the selected album or photo. Each name is limited to 20 characters and each description is limited to 255 characters.
	Delete	Delete the selected albums or photos.

NOTE

- Only logged in users will see these icons.
- To prevent system errors, Thecus IP storage sets the following limitations on photo files:
  - Each file upload is limited to a size of 8MB. Files exceeding 8MB will NOT be uploaded and no error message will appear.
  - Only these photo file types will be uploaded: *.jpg, *.gif, *.bmp, *.png, *.pcx, *.psd, *.bmp.
  - If duplicate file names exist during upload process, system will add a number in front of the original file name (abc → 1abc).

Creating Albums

To create a photo album, follow the steps below:

1. Click the ***Add*** button to create a new album.
2. Enter a name for the album, and enter a description if you wish. Then, click on the ***Create Album*** button.

Password Protecting Albums

If you would like to put a password on a particular album, follow these steps:

1. Select the album to be protected, click on the ***Edit*** button, and the **Album Edit** screen will appear.
2. The owner of the album can enter an album password to protect the album, so that only people with the correct password can view the album.

Uploading Pictures to Albums

Uploading pictures to albums using the Web User Interface is easy:

1. When the album is created, click the album icon to enter the album. Initially the album is empty.
2. Click the ***Add*** button to upload pictures into the album. The **Upload Photos** screen will appear. Users can select and upload up to 8 pictures at a time.
3. Once the picture is uploaded, you can view it in the album. The owner of the album can delete or modify the pictures with the ***Delete*** or ***Modify*** buttons on the top right hand corner

EXIF Information

While viewing pictures, you can also have Thecus IP storage display the EXIF information for each photo.

Simply click the ***EXIF*** button to display EXIF information. To hide this information, click the ***EXIF*** button again.

Slide Shows

Slide shows are a great way to enjoy pictures stored on your Thecus IP storage.

You can click on the ***Start Slide Show*** icon on the top right hand corner to start the slide show.

Photos > andy`s album > Son > DSCN0065.JPG
Filename : DSCN0065.JPG
File Size : 73853 bytes
Image Height : 480 pixels
Image Width : 640 pixels
Make : NIKON
: COOLPIX S4
DateTime : 2008:08:30 11:50:59
Flash : Flash, Auto-Mode
Focal length : 63.3 mm
Exposure Time : 1/204 sec
FNumber : f 3.5
Max Aperture : f 3.5
ISO : 68
WhiteBalance : Auto
MeteringMode : Multi-Segment
Protect Your Source
Secure Your Data

To stop the slide show, click on the ***Stop Slide Show*** icon on the top right hand corner.

Mapping a Client PC to the Thecus IP Storage

You can map share folders on Thecus IP storage so that you can access them as if they were drives on your computer. You can connect to the shared network folders on Thecus IP storage as follows:

Windows

1. Go to the **My Computer** folder in Windows.

2. In the menu bar, select ***Tools*** and then ***Map Network Drive…***

3. The **Map Network Drive** window appears.

4. Assign a drive letter for the share folder.

5. Click the ***Browse*** button to find the folder over your network. Alternatively, you may enter the folder name you wish to connect to or enter its IP address. (i.e. `\\192.168.1.100\share`)

6. Click ***Finish***. When the **Connect As…** window appears, enter your user name and password.

7. Click ***OK***. The share folder appears as the drive you assigned. You can now access this folder as though it were a drive on your computer.

Apple OS X

On an Apple computer, you can connect to shared computers and servers using a network address.

1. Choose ***Go*** > ***Connect to Server…***

2. Enter the network address for the server in the Server Address text box.
   When connecting using SMB/CIFS protocol, type:
   `smb://192.168.1.100/Folder1`
   When connecting using AFP protocol, type:
   `afp://192.168.1.100/Folder1`
   Click ***Connect***.

3. When MAC OS X is trying to connect Thecus IP storage, it will ask for a User Name and Password which has access to the folder.

4. When MAC OS X has connected to Thecus IP storage successfully, an icon representing the folder will appear on the MAC OS X desktop. You can access the folder by double clicking on the icon.

Mapping Thecus IP storage as an iSCSI Drive

With Thecus IP storage, you are able to map it as an iSCSI drive. With iSCSI, you can remotely access Thecus IP storage at great speeds, as if it were installed as a local drive in your computer.

To do this, simply follow the steps below:

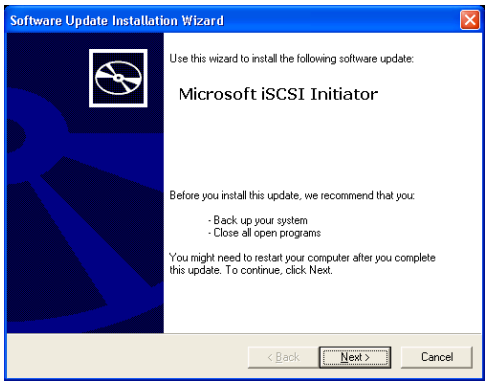
Windows 2000/XP

1. First, download the iSCSI Initiator from the Microsoft website (http://www.microsoft.com). You can find this software by entering `iSCSI Initiator` into the search box on their homepage.

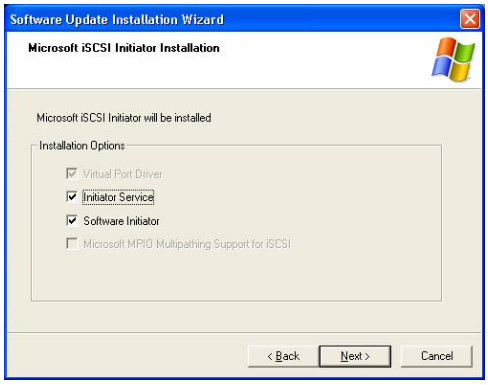
2. Once the download is complete, install the iSCSI Initiator by double-clicking the EXE file. You may be presented with the following security warning. Click ***Run*** to continue.

Open File - Security Warning
Do you want to run this file?
Name: Initiator-2.04-build3273-x86fre.exe
Publisher: Microsoft Corporation
Type: Application
From: U:\John\iSCSI
Run
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. Only run software from publishers you trust. What's the risk?

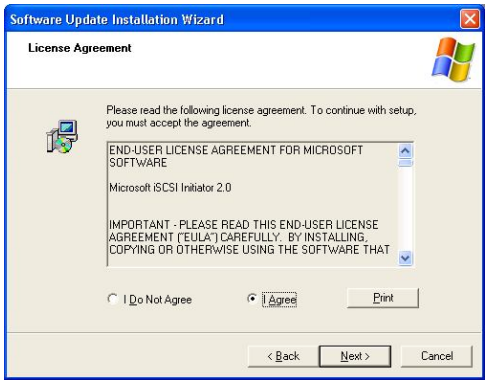
3. You will now install the iSCSI Initiator using the Setup Wizard. Click ***Next*** to continue.


Software Update Installation Wizard
Use this wizard to install the following software update:
Microsoft iSCSI Initiator
Before you install this update, we recommend that you:
- Back up your system
- Close all open programs
You might need to restart your computer after you complete this update. To continue, click Next.
< Back
Next >
Cancel

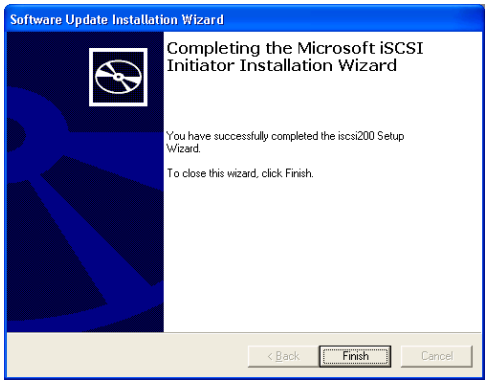
4. Leave the default selections and click ***Next***.



5. Read the license agreement. To continue with the installation, click ***I Agree*** and then click ***Next***.

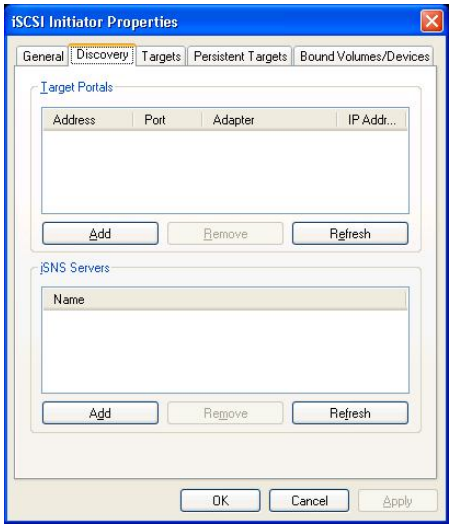

Software Update Installation Wizard
License Agreement
Please read the following license agreement. To continue with setup, you must accept the agreement.
END-USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE
Microsoft iSCSI Initiator 2.0
IMPORTANT - PLEASE READ THIS END-USER LICENSE AGREEMENT ("EULA") CAREFULLY. BY INSTALLING, COPYING OR OTHERWISE USING THE SOFTWARE THAT
I Do Not Agree
I Agree
Print
< Back
Next >
Cancel

6. The iSCSI Initiator will now install automatically. Click ***Finish*** once completed.

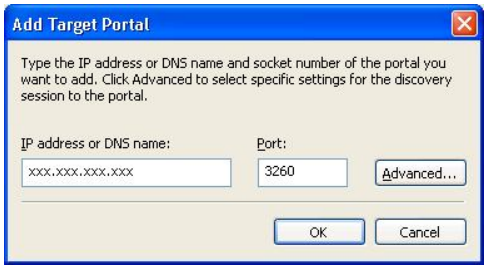

Software Update Installation Wizard
Completing the Microsoft iSCSI Initiator Installation Wizard
You have successfully completed the iscsi200 Setup Wizard.
To close this wizard, click Finish.
< Back
Finish
Cancel

7. Start the iSCSI Initiator by double-clicking its icon on the desktop. The iSCSI Initiator properties window will appear.

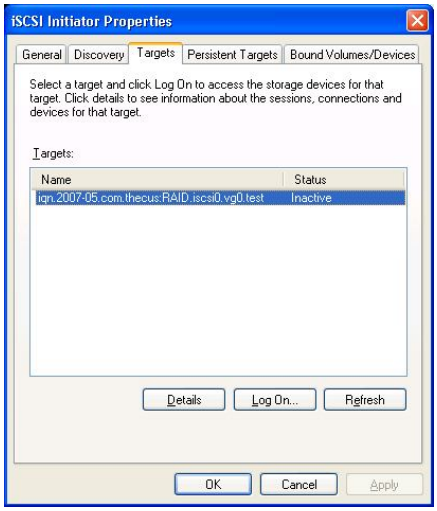
8. Select the ***Discovery*** tab. Under **Target Portals**, click ***Add***.



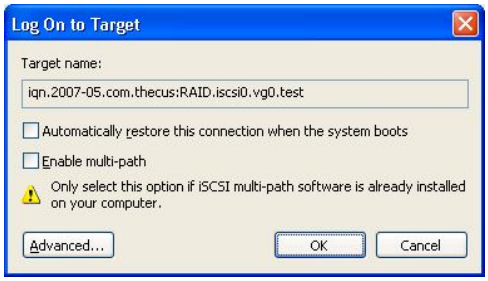
9. Enter the IP address of Thecus IP storage. Click ***OK***.


Add Target Portal
Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal.
IP address or DNS name:
Port:
xxx.xxx.xxx.xxx
3260
Advanced...
OK
Cancel

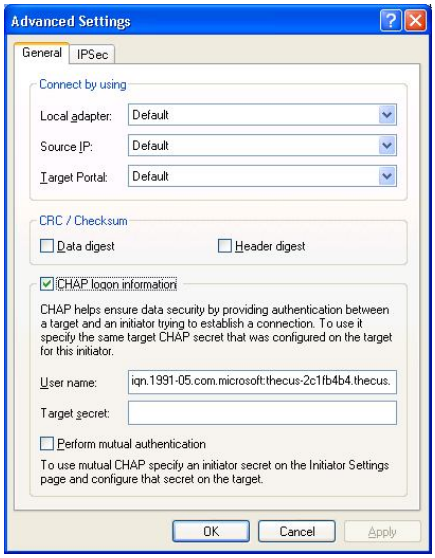
10. On the **iSCSI Initiator Properties** window, select the ***Targets*** tab. With the iSCSI target highlighted, click ***Log On***. The **Log On to Target** dialogue will appear.



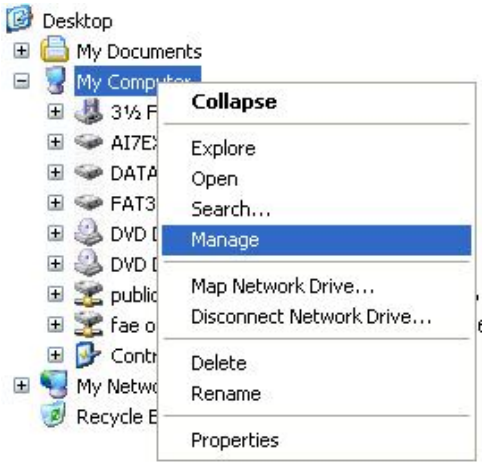
11. If you have not enabled CHAP, click ***OK*** to continue.



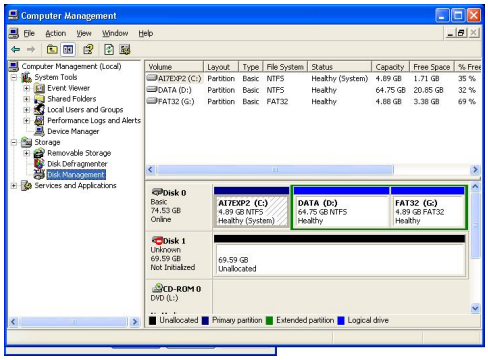
If you have enabled CHAP, click ***Advanced***. Under Advanced Settings, check the **CHAP login information** checkbox and enter your username and password. Click ***OK***.


Advanced Settings
General
IPSec
Connect by using
Local adapter:
Default
Source IP:
Default
Target Portal:
Default
CRC / Checksum
Data digest
Header digest
CHAP logon information
CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.
User name:
iqn.1991-05.com.microsoft:thecus-2c1fb4b4.thecus.
Target secret:
Perform mutual authentication
To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.
OK
Cancel
Apply

12. Right click ***My Computer*** on the desktop and select ***Manage***.



13. Click on Disk Management and you will see a new hard disk listed.



14. Initialize the new hard disk and you will then be able to use the iSCSI target as a local drive.

Windows Vista

Because Windows Vista has the Microsoft iSCSI Initiator pre-installed, you will not have to install this piece of software. Instead, start the iSCSI Initiator and follow steps 8-14 to map the Thecus IP storage as an iSCSI drive.

Chapter 6: Tips and Tricks

USB and eSATA Storage Expansion

The Thecus IP storage supports external USB hard disks through its USB ports. Once a USB hard disk has successfully mounted, the entire volume will be linked automatically to the default USB HDD folder. The Thecus IP storage supports USB external storage devices. All file names on the USB disk volume are case sensitive.

The Thecus IP storage also supports eSATA hard disks with its eSATA port.

Before attaching an eSATA or USB disk drive to Thecus IP storage, you have to partition and format it on a desktop computer or a notebook first. The attached device will be located at `\\192.168.1.100\usbhdd\sd(x)1` where `192.168.1.100` means the IP address of Thecus IP storage and `sd(x)1` stands for the first partition on the eSATA or USB disk drive.

Adding a Spare Disk

With a RAID 1, RAID 5, RAID 6, or RAID 10 volume, you can add a spare disk after the initial RAID is setup. To add a spare disk, follow the steps below:

1. On the **RAID Configuration Screen**, tick the checkbox of the hard disk you wish to designate as a spare disk.

2. Click ***Add Spare***. The disk will be configured as a spare disk. The system automatically rebuilds the spare disk when one of the disks in the RAID set fails.

Remote Administration

You can set up your Thecus IP storage for remote administration. With remote administration, you can access your Thecus IP storage over the Internet, even if your Thecus IP storage is behind a router. This is especially useful if you are traveling and suddenly need a file from your Thecus IP storage.

Setting up remote administration is a three-part process, and will require the following equipment:

- Thecus IP storage device
- Cable / DSL Router with Dynamic DNS support
- Home PC
- Internet Connection

NOTE

Router setup will differ slightly depending on router used. For this example, we will use the Asus WL500g because it has support for Dynamic DNS. Contact your router hardware vendor for setup help.

Part I - Setup a DynDNS Account

1. Go to `http://www.dyndns.org` from your home PC.
2. Click on the ***Sign Up Now*** link.
3. Check the Check boxes, select a user name (i.e.: N8800), enter your email address (i.e.: xxx@example.com), check ***Enable Wildcard***, and create a password (i.e.: xxxx).
4. Wait for an email from www.dyndns.org.
5. Open the email and click on the link to activate your account

Part II - Enable DDNS on the Router

1. Go to the router setup screen and select ***IP Config*** > ***Miscellaneous DDNS Setting*** from your Home PC.
2. Click on ***Yes*** for **Enable the DDNS Client?**
3. Select **`www.dyndns.org`**.
4. Go to router setup screen, and enter the following information:
    a. User Name or E-mail Address: **xxx@example.com**
    b. Password or DDNS Key: **xxxx**
    c. Host Name: **`www.N8800.dyndns.org`**
    d. Enable wildcard? Select ***Yes***
    e. Update Manually: Click ***Update***

Part III - Setting up Virtual Servers (HTTPS)

1. Navigate to ***NAT Setting*** > ***Virtual Server***.
2. For **Enable Virtual Server?**, select ***Yes***
3. Setup the HTTPS Server
    a. **Well-Known Applications**: Select **User Defined**
    b. **Local IP**: Enter **`192.168.1.100`**
    c. **Port Range**: **`443`** (the default HTTPS port setting on the Thecus IP storage)
    d. **Protocol**: select **TCP**
    e. Click ***Add***.
    f. Click ***Apply***.
4. Test the HTTPS connection from another computer on the Internet
    a. From a remote computer, open your browser and enter **`https://www.N8800.dyndns.org`**
    b. You should see the login page of N8800.

Firewall Software Configuration

If you are using a software firewall (i.e. Norton Internet Security) and are having trouble connecting to Thecus IP storage, you can try the following steps:

1. Double click the **NIS** icon on system tray, and then configure the **Personal Firewall**.

2. On the **Programs** page, find the **SetupWizard.exe** and change its permission to "Permit All". If it's not in the program list, use the **Add** or **Program Scan** buttons to find it.

3. On the **Networking** page, manually add N8800 IP address (i.e. `192.168.1.100`) to the **Trusted** list.

Replacing Damaged Hard Drives

If you are using RAID 1, RAID 5, or RAID 6 you can easily replace a damaged hard drive in the Thecus IP storage while keeping your data secure with the system's automatic data recovery.

Hard Drive Damage

When a hard drive is damaged and data in the RAID volume, the system LCD will display warning message also the system beeps.

Replacing a Hard Drive

To replace a hard disk drive in Thecus IP storage:

1. Remove the tray with the damaged hard disk (N0503 is using HDD rail).
2. Unscrew the damaged hard disk and remove it from the tray.
3. Slide a new hard disk into the tray and fasten the screws.
4. Insert the hard disk tray back into Thecus IP storage until it snaps into place. You can also lock it with a key if desired.
5. The LED blinks green when the HDD is accessed.

RAID Auto-Rebuild

When using RAID 1, 5, 6, or 10 on Thecus IP storage, you can use the auto-rebuild function when an error is detected.

1. When a hard disk fails the system beeps and/or an email notification is sent to specified receivers.
2. Check the LCD to see which disk has failed.
3. Follow the steps mentioned above to replace the failed hard disk.
4. The system automatically recognizes the new hard disk and starts the auto-rebuild sequence to resume its status before the hard disk crash.

Chapter 7: Troubleshooting

Forgot My Network IP Address

If you forget your network IP address and have no physical access to the system, you can find out the IP address by either looking directly onto Thecus IP storage LCD panel, or by using the setup wizard to retrieve the IP of your Thecus IP storage.

1. Start the Setup Wizard, and it will automatically detect all Thecus IP storage products on your network.

2. You should be able to find the IP address of Thecus IP storage which you have forgotten in the **Device Discovery** screen.

Can't Map a Network Drive in Windows XP

You may have problems mapping a network drive under the following conditions:

1. The network folder is currently mapped using a different user name and password. To connect using a different user name and password, first disconnect any existing mappings to this network share.

2. The mapped network drive could not be created because the following error has occurred: **Multiple connections to a server or shared resource by the same user, using more than one user name, are not allowed.** Disconnect all previous connections to the server or shared resource and try again.

To check out existing network connections, type `net use` under the DOS prompt. You may refer the URL below for more network mapping information.

http://esupport.thecus.com/support/index.php?_m=downloads&_a=viewdownload&downloaditemid=57&nav=0

Restoring Factory Defaults

From the **System** menu, choose the ***Factory Default*** item and **the Reset to Factory Default** screen appears. Press ***Apply*** to reset Thecus IP storagefactory default settings.

WARNING Resetting to factory defaults will not erase the data stored in the hard

Problems with Time and Date Settings

The administrator is able to select an NTP Server to keep Thecus IP storage time synchronized. However, if Thecus IP storage can not access the Internet, you may encounter a problem when setting the Time and Time Zone. If this happens:

1. Login to the Web Administration Interface.
2. Navigate to **System Management>*Time***.
3. Under **NTP Server**, select ***No***.
4. Set the **Date**, **Time**, and **Time Zone**.
5. Click ***Apply***.

In addition, if Thecus IP storage is able to access the Internet and you want to keep the NTP Server clock.isc.org by default, please make sure the DNS Server is correctly entered, thereby allowing the NTP Server name to correctly resolve. (See **System *Network*** > ***WAN/LAN1*** > ***DNS Server***)

Dual DOM Supports for Dual Protection

The most advance and useful of Thecus IP storage (depend on models) is Dual DOM implemented. In the normal circumstance, it has no need to have this feature involved. But with irresistible cause like power cut or human error by accident occurred especially during system booting stage, this will become the great feature to prevent system down time.
Practically while it happened, system will try to recovery the DOM 1 from DOM 2 first. If it is unachievable then system can boot from DOM 2. And all of this procedure can be operated by LCM.

NOTE

The Dual DOM in DOM1 is default master and FW upgrading will only execute in DOM1 unlike DOM2 is 'Read only" initially.
Any circumstance occurred, while DOM2 successes recover DOM1. The FW will be version of DOM2. Therefore, it may need to upgrade to the version of DOM1 it has.
If DOM1 can not be recovery from DOM2, then system will boot up from DOM2. The original configuration in DOM1 may need to setup again with DOM2 operation.

Appendix A: Customer Support

If your Thecus IP storage is not working properly, we encourage you to check out **Chapter 7: Troubleshooting**, located in this manual. You can also try to ensure that you are using the latest firmware version for your Thecus IP storage. Thecus is committed to providing free firmware upgrades to our customers. Our newest firmware is available on our Download Center:

http://www.thecus.com/download.php

If you are still experiencing problems with your Thecus IP storage, or require a Return Merchandise Authorization (RMA), feel free to contact technical support via our Technical Support Website:

http://www.thecus.com/support_tech.php

Customers in the US should send all technical support enquiries to the US contact window included in the following web page:

http://www.thecus.com/support_tech.php

For Sales Information you can e-mail us at:

sales@thecus.com

Thank you for choosing Thecus!

Appendix B: RAID Basics

Overview

A Redundant Array of Independent Disks (RAID) is an array of several hard disks that provide data security and high performance. A RAID system accesses several hard disks simultaneously, which improves I/O performance over a single hard disk. Data security is enhanced by a RAID, since data loss due to a hard disk failure is minimized by regenerating redundant data from the other RAID hard disks.

Benefits

RAID improves I/O performance, and increases data security through fault tolerance and redundant data storage.

Improved Performance

RAID provides access to several hard disk drives simultaneously, which greatly increases I/O performance.

Data Security

Hard disk drive failure unfortunately is a common occurrence. A RAID helps prevent against the loss of data due to hard disk failure. A RAID offers additional hard disk drives that can avert data loss from a hard disk drive failure. If a hard drive fails, the RAID volume can regenerate data from the data and parity stored on its other hard disk drives.

RAID Levels

The Thecus IP storage supports standard RAID levels 0, 1, 5, 6, 10, and JBOD. You choose a RAID level when you create a system volume. The factors for selecting a RAID level are:

- Your requirements for performance
- Your need for data security
- Number of hard disk drives in the system, capacity of hard disk drives in the system

The following is a description of each RAID level:

RAID 0

RAID 0 is best suited for applications that need high bandwidth but do not require a high level of data security. The RAID 0 level provides the best performance of all the RAID levels, but it does not provide data redundancy.

RAID 0 uses disk striping and breaking up data into blocks to write across all hard drives in the volume. The system can then use multiple hard drives for faster read and write. The stripe size parameter that was set when the RAID was created determines the size of each block. No parity calculations complicate the write operation.

RAID 1

RAID 1 mirrors all data from one hard disk drive to a second one hard disk drive, thus providing complete data redundancy. However, the cost of data storage capacity is doubled.

This is excellent for complete data security.

RAID 5

RAID 5 offers data security and it is best suited for networks that perform many small I/O transactions at the same time, as well as applications that require data security such as office automation and online customer service. Use it also for applications with high read requests but low write requests.

RAID 5 includes disk striping at the byte level and parity information is written to several hard disk drives. If a hard disk fails the system uses parity stored on each of the other hard disks to recreate all missing information.

RAID 6

RAID 6 is essentially an extension of RAID level 5 which allows for additional fault tolerance by using a second independent distributed parity scheme (dual parity) Data is striped on a block level across a set of drives, just like in RAID 5, and a second set of parity is calculated and written across all the drives; RAID 6 provides for an extremely high data fault tolerance and can sustain two simultaneous drive failures.

This is a perfect solution for mission critical applications.

RAID 10

RAID 10 is implemented as a striped array whose segments are RAID 1 arrays. RAID 10 has the same fault tolerance as RAID level 1.
RAID 10 has the same overhead for fault-tolerance as mirroring alone. High I/O rates are achieved by striping RAID 1 segments.
Under certain circumstances, RAID 10 array can sustain up to 2 simultaneous drive failures

Excellent solution for applications that would have otherwise gone with RAID 1 but need an additional performance boost.

JBOD

Although a concatenation of disks (also called JBOD, or "Just a Bunch of Disks") is not one of the numbered RAID levels, it is a popular method for combining multiple physical disk drives into a single virtual one. As the name implies, disks are merely concatenated together, end to beginning, so they appear to be a single large disk.

As the data on JBOD is not protected, one drive failure could result total data loss.

Stripe Size

The length of the data segments being written across multiple hard disks. Data is written in stripes across the multiple hard disks of a RAID. Since multiple disks are accessed at the same time, disk striping enhances performance. The stripes can vary in size.

Disk Usage

When all disks are of the same size, and used in RAID, Thecus IP storage disk usage percentage is listed below:

RAID Level	Percentage Used
RAID 0	100%
RAID 1	1/n x 100%
RAID 5	(n-1)/n x 100%
RAID 6	(n-2)/n x 100%
RAID 10	50%
JBOD	100%

n : HDD number

Appendix C: Active Directory Basics

Overview

With Windows 2000, Microsoft introduced Active Directory (ADS), which is a large database/information store. Prior to Active Directory the Windows OS could not store additional information in its domain database. Active Directory also solved the problem of locating resources; which previously relied on Network Neighborhood, and was slow. Managing users and groups were among other issues Active Directory solved.

What is Active Directory?

Active Directory was built as a scalable, extensible directory service that was designed to meet corporate needs. A repository for storing user information, accounts, passwords, printers, computers, network information and other data, Microsoft calls Active Directory a "namespace" where names can be resolved.

ADS Benefits

ADS lets Thecus IP storage integrate itself with the existing ADS in an office environment. This means the Thecus IP storage is able to recognize your office users and passwords on the ADS server. Other major benefits ADS support provides include:

1. Easy integration of Thecus IP storage into the existing office IT infrastructure

   The Thecus IP storage acts as a member of the ADS. This feature significantly lowers the overhead of the system administrator. For example, corporate security policies and user privileges on an ADS server can be enforced automatically on Thecus IP storage.

2. Centralized user/password database

   The Thecus IP storage does not maintain its own copy of the user/password database. This avoids data inconsistency between Thecus IP storage and other servers. For example, without ADS support, an administrator might need to remove a specific user privilege on Thecus IP storage and each individual server. With ADS support, the change on an ADS server is known to all of its ADS members.

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